Historial 63

Sobres

1

ESTRICTAMENTE SECRETO Y CONFIDENCIAL

JEFATURA DE INTELIGENCIA

Buenos Aires, 9 *de* **setiembre** *de 198*1

INFORMATIVO PARA: [illegible]

JEIM,IM4,3 N° 412 "ESC"/ 81. Ejemplar N° [illegible].

ORIGEN: JEFATURA DE INTELIGENCIA.

ASUNTO: Capacidad británica de movilización de una fuerza de despliegue rápido.

La publicación del Instituto Internacional de Estudios Estratégicos, "Strategic Survey", al referirse a la capacidad de combate y movilización que dispondría BRAN BRETAÑA como aporte a la "Fuerza de Rápido Despliegue" creada a iniciativa de EE.UU., dice lo siguiente:

"La cooperación anglo-americana en la planificación de las contingencias sobre la seguridad afuera de Europa ha sido más directa (que con Francia) - el 'White Paper' sobre la Defensa británica de abril 1980 argumentó que la tarea no debe dejársela abandonada a los Estados Unidos - pero las Fuerzas británicas son modestas en proporción. Los Comandos de la Armada Real y las unidades del Ejército, en particular la octava Fuerza de Campaña, que fueron juntadas en un pool con un Batallón de Paracaidistas (cerca de 600 hombres), están disponibles para entrar en operaciones luego de siete días de notificadas. El aerotransporte del Reino Unido también es limitado, pese a que dos tercios de sus cuarenta y cinco aviones de transporte C-130 se suponen tendrán un fuselaje ampliado para 1983, con el objeto de aumentar su capacidad de carga".

Cuando en el REINO UNIDO se debatía la posibilidad de constituir una fuerza de ese tipo, en un artículo de "The Times" se expresaba que su costo era excesivo, por lo que el gobierno británico habría optado por asegurar la disposición de servicios lo suficientemente flexibles, como para hacer //

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frente a las diferentes clases de operaciones que se pueden presentar en la zona del GOLFO PERSICO, ZIMBABWE o las ISLAS MALVINAS.

A. RECIACION

Si bien el tema de la disponibilidad de fuerzas británicas de rápido despliegue, está fundamentalmente relacionado con zonas donde existen situaciones críticas que pueden requerir su empleo, como es el caso del GOLFO PERSICO, el tratamiento de su constitución hace que inmediatamente surja, ya sea en fuentes gubernamentales como en medios de la opinión pública, la posibilidad de su utilización en las ISLAS MALVINAS ante una supuesta acción por parte de nuestro país.

Esto demuestra que existe una elevada sensibilización respecto a la posibilidad de que ARGENTINA intente ocupar las islas y una definida posición a favor de una respuesta militar contundente dentro de las posibilidades de sus FF.AA.

La muy semejante situación existente entre las MALVINAS y las GEORGIAS DEL SUR, hacen suponer que cualquier operación propia sobre éstas últimas, producirían en GRAN BRETAÑA una reacción similar a la que ocurriría si el hecho tuviese lugar en el archipiélago malvinense.

Con ello se confirmaría las apreciaciones formuladas por esta Jefatura en los Informativos JEIN-IM4,3 nros. 318 y 412 "ESC"/81, en cuanto a las consideraciones y dificultades a tener en cuenta en el planeamiento de una acción efectiva sobre las Islas GEORGIAS DEL SUR.

VALOR DE LA INFORMACION: -

C.O.N			
Dpto ... L... ENCI			
Entrada 16 SET 1981			
Nro. Ent.: D-215			
GIRO INTERNO			
Jefe Dep. Inteligencia			
Jefe Div. Marco Regional			
Jefe Div. Marco Interno			
Jefe Div. Acción Sicológica			
Jefe Div. Intelig. de ...			
Jefe Div. Ad...			

ARMADA ARGENTINA
ESTADO MAYOR GENERAL DE LA ARMADA
JEFATURA DE INTELIGENCIA

EDUARDO M. GIRLING
CONTRAALMIRANTE
JEFE

2

ESTRICTAMENTE SECRETO Y CONFIDENCIAL

JEFATURA DE INTELIGENCIA

Buenos Aires, 7 *de* setiembre *de* 1981

INFORMATIVO PARA: archivo.

JEIM,IM4,3 Nº 412 "ESC"/ 81. Ejemplar N

ORIGEN: JEFATURA DE INTELIGENCIA.

ASUNTO: ANTARTIDA: Posible clausura de bases británicas y su interés político.

Las reducciones sustanciales en el presupuesto general británico han repercutido sobre el accionar antártico. Se está estudiando que medidas se pueden adoptar sin afectar el nivel de investigación científica, ya que se considera que éste se encuentra en el mínimo imprescindible.

Ahorro en el consumo de combustible, reducción de actividades en algunas bases o clausura de una o más de ellas, son las tres opciones que prometen una disminución apreciable de los gastos sin provocar demasiado daño en las tareas investigativas. Las economías en otros rubros, ya aprobadas, no totalizan el monto indispensable.

En el análisis de las bases que podrían ser cerradas se ha determinado lo siguiente:

"ROTHERA" (Isla General Belgrano): Significaría el fin de los programas científicos sobre tierra, en momentos en que la prospección de hidrocarburos, metales y otros recursos se intensifica en todo el mundo.

"HALLEY" (Bahía Halley): Es la de mayor importancia en los estudios de la atmósfera y la información que suministra sobre el clima es de gran valor. Su reconstrucción ha sido aprobada para 1982/83.

"SIGNY"(Islas Orcadas): Se paralizarían los estudios de biología terrestre y agua dulce para los que se han realizado grandes inversiones y no podría realizarse el reconocimiento de los sistemas locales antárticos.

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"GRYTVIKEN" (Islas Georgias) y "FARADAY" (Isla Galíndez): Podrían clausurarse una vez terminados los programas científicos en desarrollo.

Bajo estas circunstancias la decisión se centró en estas dos bases. Sobre "FARADAY" no ha trascendido ninguna otra información, mientras que para "GRYTVIKEN" se han formulado las siguientes consideraciones:

1. Hasta fines de julio la clausura de la base fue analizada solamente desde el punto de vista científico y posteriormente [illegible] conversarse con el Ministerio de Relaciones Exteriores y el Commonwealth para decidir si produciría implicancias políticas.
2. Que RR.EE. aprecia la fama internacional [illegible] como consecuencia del alto nivel científico alcanzado, [illegible] tancia que apoya admirablemente sus objetivos de política [illegible] nacional.
3. Que ha quedado en claro que el retiro de los [illegible] en Gritviken podría tener serias consecuencias políticas, por lo que se buscan urgentes alternativas al cierre total [illegible] ción.
4. Que a partir del fin del actual año fin[illegible] los [illegible] pondientes serán provistos por otra fuente distinta al [illegible] Antarctic Survey (BAS).
5. Que aún no se ha tomado ninguna medida [illegible] de la base, estimándose como probable que continúe [illegible]. (Valor Información: B-2).

APRECIACION

Además de apreciarse la impor[illegible] UNIDO concede a la prospección de recursos natur[illegible] y a la investigación científica que allí se desarrolla, no [illegible] su implicancia económica, sino también por el [illegible] actividades proveen a su política exterior, [illegible] te demuestra el interés de GRAN BRETAÑA por [illegible] en el archipiélago de las Georgias del Sur, [illegible] su alejamiento de la zona podría tener serias [illegible] [illegible].

Si bien no se menciona a ARGENTINA y el [illegible] existente entre ambas naciones por la posesión y soberanía [illegible] la región, es evidente que esta es una o la más importante [illegible] causas de tales consecuencias.

ESTRICTAMENTE SECRETO Y CONFIDENCIAL

Por lo tanto, este gran valor político que los británicos asignan a Grytviken y su permanencia allí, debe ser convenientemente evaluado al analizar cualquier acción posible a emprender por parte de nuestro país en la Islas Georgias del Sur, dado que la reacción a esperar por parte de ellos será proporcional a aquel.

DISTRIBUCION: Ej.01:CCAN; Ej.02:EMGA; Ej.03: [illegible]; Ej.04: [illegible] y Ej. 05:Archivo JEIN.

INTERVENCION: Cap. de Nav. [illegible]
Cap. de Nav. [illegible]
Cap. de Corb. [illegible]
JTTF (...) [illegible]

EDUARDO M. [illegible]
CONTRAALMIRANTE
Jefe

Dpto. B
Secc. 8

ES COPIA

JS

ESTADO MAYOR GENERAL DE LA ARMADA
DEPARTAMENTO "B"
JEFATURA DE INTELIGENCIA

CARLOS ALBERTO LOUGE
CAPITAN DE NAVIO
JEFE

JORGE T. HILDMANN
GESTOR
DIVISION SECRETARIA

ESTRICTAMENTE SECRETO Y CONFIDENCIAL

JEFATURA DE INTELIGENCIA

Buenos Aires, 3 *de* julio *de* 1981

INFORMATIVO PARA: SEÑOR JEFE DEL ESTADO MAYOR GENERAL DE LA ARMADA.

JEIN,IM4,3 Nº 318 "ESC"/ 81. Ejemplar N

ORIGEN: JEFATURA DE INTELIGENCIA.

ASUNTO: E/trabajo sobre las Islas GEORGIAS Y SANDWICH DEL SUR.

Adjunto elevo un estudio realizado en esta Jefatura sobre la situación de las Islas GEORGIAS y SANDWICH DEL SUR.

AGREGADOS: Lo que se indica en el texto.

DISTRIBUCION: Original Destinatario - Duplicado Archivo.

INTERVENCION: Cap. de Nav. D. AMAURY C. RICARDO.
Cap. de Nav. D. CARLOS ALBERTO DOUCE.
Cap. de Corb.D. JULIO C. JUAREZ
SMIF(RE) JUAN S. SERRA.

ES COPIA

Dpto. E
Secc. 5

15

ESTADO MAYOR GENERAL DE LA ARMADA
JEFATURA DE INTELIGENCIA

CARLOS ALBERTO LOUGE
CAPITAN DE NAVIO
JEFE

SEGUNDINO ARAGE
SM (RE)

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ESTRICTAMENTE [illegible] [illegible]IAL

ISLAS GEORGIAS DEL SUR Y SAN[illegible]

Dentro del contexto de las negociaciones por la soberanía [illegible] MALVINAS, se encuentran incluídas las GEORGIAS y [illegible]. Sin embargo, no existen para estos archipiélagos, antecedentes [illegible], geográficos y políticos, tan sólidos como los que sustentan [illegible] reclamaciones en el caso malvinero.

En efecto, sintéticamente la situación e[illegible] la siguiente:

SANDWICH DEL SUR:

Del conjunto de islas que componen este archipiélago, el británico James COOK descubrió en 1775 las que se encuentran al sur y [illegible] ruso BELLINGHAUSEN, las situadas en el extremo norte.

Posteriormente fueron visitadas por cazadores de balle[illegible], pero siempre estuvieron deshabitadas.

La presencia argentina en las islas tuvo su punto de partida [illegible], cuando el rompehielos ARA "SAN MARTIN" desembarcó [illegible] instalar un refugio, que días después debió ser evacuado [illegible] de la erupción de un volcán en una isla vecina.

Desde esa fecha hasta el verano de 1976/77, las islas [illegible] deshabitadas. En esa oportunidad la [illegible] Científica "CORBETA URUGUAY" en THULE [illegible] en forma permanente todo el año.

GEORGIAS DEL SUR:

De los navegantes que se adjudicaron el descubrimiento [illegible] DEL SUR, el más serio y veraz es el de origen [illegible] capitán del navío mercante español "LEON", que las circun[illegible] tres días en junio de 1756, bautizándolas [illegible], ubicándolas [illegible] Latitud y Longitud que ofrecen muy poca diferencia con las correct[illegible].

Posteriormente fueron visitadas por James COOK en 1775, quien [illegible] que anteriormente lo habían hecho los españoles del navío [illegible].

No obstante, desembarcó en ella y tomó posesión [illegible]

denominándolas en su honor con el nombre que hoy tienen.
La presencia argentina se manifestó a partir de 1904 cuando se estableció en GRYTVIKEN la Compañía Argentina de Pesca, empresa creada en BUENOS AIRES con capitales nacionales y que operó bajo leyes argentinas.
Hasta entonces las islas habían estado deshabitadas. Esta compañía permaneció hasta 1954, fecha en que todas sus instalaciones fueron transferidas a la sociedad británica "ALBION STAR", con sede en LONDRES. La compañía obtuvo en 1906 una concesión del gobierno inglés (licencia de pesca), por la cual tuvo que abonar un impuesto.
Otra instalación estable en las islas, fue la de una oficina meteorológica que la citada compañía montó con autorización del gobierno nacional siendo el costo de mantenimiento absorbido por la empresa.
La misma operó desde el 1° de enero de 1905 hasta 1950, fecha en que el gobierno inglés se incautó de sus instalaciones, enviándolas a ... V. ...
Hasta 1924, las islas fueron visitadas por unidades de nuestra A R A en escalas técnicas.

POSICION BRITANICA

El interés británico por las islas GEORGIAS DEL SUR y SANDWICH DEL SUR se puso de manifiesto en 1906, como consecuencia del auge de la industria ballenera, ya que la zona era frecuentada por cazadores de varios países.
GRAN BRETAÑA impuso su poder marítimo e hizo a la vez valer sus ... dos derechos de descubrimiento, obligando a todo el mundo que iba a la zona por actividades pesqueras, a pagarle derechos e impuestos.
En base a esos antecedentes, en cierta forma, se justifica que la Compañía Argentina de Pesca, puesta en un aprieto, se inclinase por el negocio y no por el patriotismo, pidiendo y obteniendo de los ingleses la licencia de pesca para continuar con sus operaciones.
Dos años después, en 1908, en declaración unilateral, por ... ... , anexó el sector antártico comprendido entre los meridianos 20 ... y el paralelo 50° S, sin tener en cuenta que el sector ... ...

parte de la patagonia argentina y una provincia chilena.
Por el mismo documento se estableció que el Gobernador de las ISLAS MALVINAS lo sería también de las "Dependencias".
El 28 de marzo de 1917 el Rey sancionó una nueva Carta Patente británica fundamentada en que se habían presentado dudas con respecto a los límites fijados por la anterior, En ella se precisó que las "Dependencias de las ISLAS MALVINAS" incluirían todas las islas y territorios comprendidos entre los 20° y 50° W situados al sur del paralelo 50° S y todas las islas y territorios comprendidos entre los 50° y 80° W al sur del paralelo 58° S.
En 1962 el gobierno creó el Territorio Antártico Británico, comprendido por los meridianos 20° y 80° O y el paralelo 60° S, como colonia separada de las "Dependencias de las ISLAS MALVINAS", con lo que éstas quedaron reducidas a las GEORGIAS Y SANDWICH.
Pese a ello, la principal base de apoyo y comunicaciones antárticas del REINO UNIDO se mantiene en GRYTVIKEN, fuera del sector mencionado.

ASPECTOS DE INTERES EN LAS NEGOCIACIONES

El gobierno argentino formuló reclamaciones territoriales al británico en 1925 por las ORCADAS DEL SUR, en 1927 por las GEORGIAS y SANDWICH DEL SUR y a principios de 1937 por todos los territorios de las "Dependencias de las ISLAS MALVINAS". Posteriormente lo hizo extensivo a los territorios que forman parte del Sector Antártico (25° y 74° O y el paralelo 60° S).
Luego de la aprobación de la Resolución 2065 en las NACIONES UNIDAS, el 16 de diciembre de 1965, con motivo de las controversias existentes entre nuestro país y el REINO UNIDO, se iniciaron las conversaciones bilaterales por la posesión del archipiélago de las MALVINAS, entre ambos países pero sin hacer mención a las islas que forman parte de sus dependencias.
Esta aparente exclusión de GEORGIAS Y SANDWICH DEL SUR en las conversaciones bilaterales, fue concebida por nuestra Cancillería, [illegible] in-

terferir en el tema que era prioritario, es decir, lograr los avances significativos en el reconocimiento de nuestros derechos soberanos en las ISLAS MALVINAS, y luego sí, manifestar nuestro interés en tratar el tema de las islas mencionadas.

En 1976 cuando los británicos comenzaron a pensar en la cooperación económica con nuestro país en el ATLANTICO SUR OCCIDENTAL, se tuvo la certeza que no pasaría mucho tiempo sin que el tema GEORGIAS Y SANDWICH DEL SUR fuese incorporado en las tratativas. En efecto, la inclusión de estos dos archipiélagos como tema de conversación tuvo su punto de partida en la propuesta que el Ministro ROWLANDS hizo cuando visitó BUENOS AIRES en febrero de 1977, la que contemplaba dos temas concretos:

1.- Soberanía: Obtener mediante acuerdos solución definitiva sobre MALVINAS, GEORGIAS y SANDWICH DEL SUR, incluyendo los espacios marítimos y submarinos.

2.- Cooperación económica: Paralelamente negociar sobre cooperación económica en el ATLANTICO SUR OCCIDENTAL.

Esta propuesta, fue tratada en abril de 1977 por primera vez y continúa vigente en las conversaciones posteriores.

APRECIACION

Como ya se manifestó, existe una relativa debilidad argumental para sostener los reclamos argentinos sobre la soberanía de las islas GEORGIAS y SANDWICH DEL SUR que para ser subsanada requiere la ejecución de una política activa que vaya creando los antecedentes necesarios que permitan garantizar la vigencia de nuestros derechos sobre las mismas.

Asimismo, la falta de una acción permanente tanto en el campo diplomático como en el operativo, contribuye para que terceros estados consideren a tal inacción como una aceptación por parte de ARGENTINA de la situación existente y operen con sus flotas pesqueras en el mar adyacente a las islas, con la anuencia tácita o expresa del REINO UNIDO.

La ocurrencia de algunos incidentes esporádicos, como los sucedidos en aguas continentales o de las MALVINAS (interceptación o captura de buques

extranjeros y el caso GRACK ETCH) no resultan suficientes para neutralizar lo anteriormente expuesto, dado que la mayoría de ellos acontecieron fuera de la zona en estudio y respondieron a una motivación específica y no a un accionar continuo y coherente.

En el archipiélago de las SANDWICH esta carencia ha sido resuelta en gran medida con la instalación primero del refugio mencionado en 1955 y luego con la Base Científica permanente "CORBETA URUGUAY" en la isla THULE a partir de 1976. Se requeriría ahora complementar estos hechos con una por lo menos frecuente acción de vigilancia y contralor en las 200 millas de mar adyacente para reafirmar la vigencia de nuestros derechos soberanos y proteger los recursos económicos existentes.

En consecuencia, son las islas GEORGIAS DEL SUR las que no cuentan con un marco adecuado que sustente nuestras pretensiones y por lo tanto es en ellas donde resulta imprescindible actuar con decisión, continuidad y eficacia.

En principio se observan tres modos de acción que desde el punto de vista operativo podrían ejecutarse.

1°) Instalar una base permanente subantártica similar a las de SANDWICH.

2°) Efectuar periódicas navegaciones y sobrevuelos, incluyendo [illegible] desembarcos de reconocimiento y permanencia de [illegible] dero.

3°) Establecer continuo control de las actividades pesqueras dentro de las 200 millas.

El primero es evidentemente el proceder que crearía el antecedente más válido para justificar nuestra reclamación de soberanía, tanto frente al REINO UNIDO como ante terceros estados y ya sea en tierra como en el mar circundante.

Sin embargo las consecuencias inmediatas pueden ser desfavorables, puesto que la reacción británica no va a ser suave como cuando se instaló la base en las SANDWICH. Las GEORGIAS no son islas deshabitadas [illegible] a-

quéllas, al contrario la presencia inglesa [illegible], como se dijo, [illegible] principios de siglo, ha ejercido autoridad en la región [illegible] las instalaciones actuales conforman la estación principal [illegible] TIC SURVEY (BAS).

Aún en el supuesto caso de que el gobierno de la Corona quisiera [illegible] le trascendencia a un hecho semejante, en pro de un [illegible] negociaciones por las MALVINAS, impulsado por otros motivos [illegible] el económico, la repercusión pública interna sería de tal [illegible] le impediría proceder de esa manera y lo llevaría [illegible] ón adoptando medidas que enturbiarían las relaciones [illegible] gelaría las negociaciones, al menos por un tiempo [illegible].

No se estima desacertado pensar que una acción como la [illegible] considerada por GRAN BRETAÑA mucho más grave que el [illegible] reacción sería consecuente con ella.

Desde el punto de vista material se considera factible [illegible] que de costo sensiblemente elevado.

El segundo modo de acción enunciado [illegible] de la ARMADA que preven navegar [illegible] nidad favorable.

También es factible de ejecutar [illegible] el anterior y [illegible] para reafirmar [illegible] erritorios.

Es previsible que la respuesta británica [illegible] descriptas anteriormente, pero no [illegible] un entorpecimiento [illegible] tienda su [illegible] archipiélagos, [illegible] por la denuncia [illegible] al Comité [illegible] por considerar [illegible] del [illegible] [illegible] 31/49 de la Asamblea General.

La tercera [illegible] fue analizada [illegible]

cial en nuestra Cancillería en 1980, como consecuencia del pedido de instrucciones políticas que le formuló la ARMADA, para proceder ante la presencia de pesqueros polacos en la región.
No solo en esa oportunidad se la consideró apta, sino que se estimó conveniente mantener ese control continuo, previéndose que la reacción del REINO UNIDO sería del tipo de la señalada en el caso anterior pero de una intensidad tal que no alcanzaría a perjudicar sensiblemente las negociaciones por MALVINAS.

ACCION RECOMENDADA

En consecuencia, a fin de crear nuevos antecedentes, consolidar el ejercicio de nuestra soberanía en los archipiélagos de las Islas GEORGIAS y SANDWICH DEL SUR y áreas marítimas adyacentes, se considera conveniente llevar a cabo un plan de acción progresivo en función de la reacción británica consistente en:

1°) Intensificar y mantener un continuo control de las actividades pesqueras dentro de las 200 millas marinas de las Islas GEORGIAS [illegible] SUR, ampliándolo en toda oportunidad favorable hasta el área correspondiente a las SANDWICH DEL SUR, navegando y sobrevolando los [illegible]cionados archipiélagos siempre que resulte factible.
2°) Efectuar navegaciones de reconocimiento costero en las Islas [illegible]GIAS, fondeando en puertos naturales y desembarcos patrullas [illegible] exploración.
3°) Instalar una base científica y de apoyo a la navegación y faros y señales marítimas.

Los pasos 2°) y 3°) deben ser analizados conjuntamente con la Cancillería, a fin de determinar la conveniencia y oportunidad de su ejecución.

[illegible]

ESTADO MAYOR GENERAL [illegible] JEFATURA [illegible]

ARMADA ARGENTINA

SECRETO

Nº 01/82"S"
Letra JEIN,OC9.15.

BUENOS AIRES, 7 de abril de 1982.

OBJETO: R/Carpeta Apreciación Capacidades Fuerza Británica.

AL SEÑOR COMANDANTE DE OPERACIONES NAVALES.

Agrego [illegible] A-
CION CAPACIDADES OPERATIVAS DE LA [illegible]".-

AGREGADOS: Ejemplar Nº 04-05-06 y 07.

DISTRIBUCION: Ej. 01 J-II [illegible] - 0[illegible] -II [illegible]
EMCO - 04 COOP - 0[illegible] COIN - 0[illegible] -
07 COAVIAVAL - 0[illegible] [illegible]GA - 09 JECP - 10 ARCHIVO
JEIN.-

ARMADA ARGENTINA
ESTADO MAYOR GENERAL DE LA ARMADA
JEFATURA DE INTELIGENCIA

EDUARDO M. GIRLING
CONTRAALMIRANTE
JEFE

SECRETO

APRECIACION CAPACIDADES OPERATIVAS DE LA FUERZA DE ATAQUE BRITANICA

1 - CAPACIDAD LOGISTICA.

2 - CAPACIDAD ANFIBIA.

3 - CAPACIDAD ANTISUPERFICIE.

4 - CAPACIDAD DE DEFENSA AEREA.

5 - CAPACIDAD ANTISUBMARINA.

6 - CAPACIDAD DE ATAQUE AEREO.

Por OF. JEIN; OC9.15 Nº Ø3/82 "S" se reemplazaron fojas Nº 8 y 65.-

 SECRETO

FUERZA DE ATAQUE BRITANICA

APRECIACION CAPACIDAD LOGISTICA

Conclusiones:

1. Víveres: para 45 días de operaciones sin efectuar reaprovisionamientos en el mar.

   Poseen reserva en los buques transportes.

   Este factor no limita la operación.

2. Municiones: La limitación que se aprecia es del tipo aéreo.

3. Combustible: su reabastecimiento está facilitado por 3 buques RAS de 25/30.000 tns. de carga de combustible. Cada uno de estos buques seran suficiente para reponer el consumo de 12/15 días de la fuerza a una velocidad de 16/18 nudos.

   Esta estimación daría una capacidad para operar durante aproximadamente 45 día sin tener que recurrir a un punto de apoyo.

CAPACIDAD LOGISTICA ENUNCIADA

La Fuerza de Ataque Británica posee capacidad Logística móvil para operar aproximadamente 45 días. Puede recorrer 14.500 millas, aproximación, regreso y 15 días en área de operaciones.

APRECIACON DEL COSTO.

Teniendo en cuenta los gastos de combustible y víveres exclusivamente, la fuerza de ataque británica incurre en un gasto aproximado de U$S 1.000.000 por día.

CONSUMO DE COMBUSTIBLES - FUERZA DE ATAQUE

UNIDADES	POTENCIA INSTALADA	TIPO COMBUSTIBLE	CONSUMO TON/DIA PARA CADA BUQUE DE SU CLASE		CANTIDAD BUQ.	CONSUMO DIARIO DE LA FLOTA OPONENTE		VEL MAX DE C/TIPO DE BUQUE	RADIO DE ACCION DADO POR JANE'S	OBSERVACIONES
			18 Nd	25 Nd		18 Nd	25 Nd			
INVENCIBLE	112.000 HP 4 OLYMPUS	T.NAVAL	160	380	1	160	380	28	5000 a 18Nd	
HERMES	76.000 HP TURB.VAPOR	FUEL O DIESEL OIL	180	400	1	180	400	28	7500 a 17Nd *	
CL COUNTY	30000+30000 HP VAP+GAS	T.NAVAL	75	200	2	150	400	30	6000 a 17Nd *	
CL	8500+56000 HP 2 TYNE+ 2 OLYMPUS GAS	T.NAVAL	55	175	3	165	525	30	4500 a 18Nd	
CL 42	7400+50000 HP 2 TYNE +2 OLYMPUS GAS	T.NAVAL	55	175	4	220	700	29	4000 a 18Nd	
CL 21	8500+ 56000 HP 2 TYNE+ 2 OLYMPUS GAS	T.NAVAL	50	160	2	100	320	30	4000 a 17Nd	
CL LEANDER	30000 HP TURB.VAPOR	DIESEL OIL O T.NAVAL	55	170	3	165	510	[illegible]	4000 a 15Nd	
CL 12	30000 HP TURB.VAPOR	DIESEL/FUEL T. NAVAL	55	170	4	220	680	30	4000 a 16Nd *	
CL FEARLESS	22000 HP CALD.VAPOR	DIESEL/FUEL T.NAVAL	120	---	2	240	---	21	5000 a 20Nd	

SECRETO

Cl LANCELOT (AK)	10000 HP M.DIESEL	T.NAVAL	40	--	2	80	--	17	8000 a 15 Nd	2441 Ton Carga General
CL AO PETROLEROS	14000 HP M.DIESEL	T.NAVAL	60	--	3	180	--	15,5	--	25000 a 30000 Ton ~~Co~~ bust. c/u.
CL AEF REABASTEC.	20000 HP T. VAPOR	DIESEL/FUEL T. NAVAL	140	--	2	280	--	21	--	3500 Ton Carga General 10000 Ton Comb c/u.
SSN SUPERB	NUCLEAR	U	--	--	2	--	--	30 (Sumerg)	--	--
SS -- CL OBERON	3700 HP M.DIESEL	T. NAVAL	20	--	1	20	--	17 (Sup)	9000 a 16Nd En Superf.	
OTAL	--	--	--	--	32	2160	3915	--	--	--

Estimada

SECRETO

SECRETO

DOTACIONES OPONENTE

"HERMES"	1350	1350
"INVENCIBLE"	900	900
"COUNTY"	471x2=	942
CL 42	300x4=	1200
CL 21	177x2=	354
CL 22	250x3=	750
"LEANDER"	260x3=	780
CL 12	235x4=	940
"SUPERB"	97x2=	194
"OBERON"	71x1=	71
AOS	55x3=	165
AEF	201x2=	402
"LANCELOT"	68x2=	136
	340x2=	680
"FEARLESS"	580x2=	1060
	700x2=	1400
		11324

Calculando un menú de 10 U$S-hombre/día, sería: 110.000

110.000 U$S en comidas
750.000 U$S en combustibles+lubric.

860.000 U$S corto día navegación pura Vd 18 Nds.

SECRETO

ACLARACIONES A LA PLANILLA DE EVALUACION DE CONSUMO DE COMBUSTIBLES

1. Se ha evaluado el consumo de las unidades de línea para las velocidades de 18 nudos y 25 nudos.

2. Se ha evaluado el consumo de los petroleros y unidades de transporte a un régimen de aproximadamente el 80 % de su potencia máxima (90 % de velocidad máxima).

3. Se ha evaluado el consumo de los buques mercantes y de pasajeros a baja velocidad, para "permanencia en zona".

4. El consumo diario total de todas las unidades en operaciones sería del orden de las 2.000 toneladas.

5. La capacidad de carga de combustibles de los buques de reaprovisionamiento es del orden de 139.000 toneladas.

6. Se estima que sin nuevos aportes de combustibles, la Fuerza Inglesa podría permanecer alrededor de 75 dias en actitud de bloqueo si sus unidades no desarrollan altas velocidades por períodos prolongados de tiempo.

JEFATURA DE INTELIGENCIA
* INTELIGENCIA MILITAR *
DEPARTAMENTO "B"

ALFREDO LUZURIAGA
CAPITAN DE FRAGATA
JEFE

SECRETO

APRECIACION SOBRE LA CAPACIDAD ANFIBIA DE LA FUERZA DE ATAQUE BRITANICA

a. Transporte Anfibio:

Tres Batallones de Desembarco transportados; uno, del orden de 600 hombres en el HMS "HERMES", operando como LPH (buque Portahelicópteros) y otros dos del orden de 500 hombres cada uno en los buques de desembarco dique (LPD), HMS "FEARLESS" y HMS "INTREPID".

Total de la tropa de asalto hasta 1.600 hombres.

b. Asalto Anfibio:

Cada Batallón de Desembarco puede desembarcar 2 secciones de Tiradores reforzados en asalto empleando 4 LCVP y dos Compañías de Tiradores reforzadas empleando cada una 2 LCM 9.

c. Helidesembarco:

1) El LPH puede helitransportar en un vuelo, compuesto por 3 olas de hasta 18 helicópteros, una agrupación de desembarco formada en base a una Compañía de Tiradores reforzada.

2) Cada uno de los LPD puede helitransportar [illegible] con 5 helicópteros, una agrupación de desembarco formada en base a una Sección de Tiradores reforzada.

d. Apoyo Naval:

Practicamente todos los Destructores y Fragatas que integran la Fuerza Naval de Ataque Británica cuentan con un solo monta

SECRETO

je de cañones de 4,5" (115 mm) modelo Mk 8 ó Mk 6 (montaje doble), los que si bien son muy efectivos, tienen una altísima velocidad de fuego y trayectoria muy tesa, resultando poco convenientes para el fuego naval de apoyo. Para contrarestar esta limitación a cada Agrupación de Desembarco posiblemente se le asignen, <u>como mínimo</u>, dos Fragatas tipo 12 y tipo "Leander".

e. <u>Apoyo Aeronaval</u>:

Los aviones "SEA HARRIER" disponibles, posiblemente sólo dos Escuadrones de 8 aviones cada uno, no podrán empeñarse en otro tipo de misiones que la de protección de la Fuerza Naval de Ataque Británica. Esta limitación constituye un significativo factor de debilidad de la capacidad de apoyo aeronaval de la Fuerza de Desembarco.

f. <u>CONCLUSION</u>:

1) La Fuerza Naval de Ataque Británica dispone de suficientes elementos de desembarco y medios como para concretar hasta tres movimientos de asalto por superficie y dos helitransportes.

2) La disponibilidad de buques para Apoyo Directo permite la asignación simultánea de hasta dos buques para cada Agrupación de Desembarco, a pesar de lo cual el fuego naval de apoyo no alcanzará la eficacia necesaria.

3) La aviación embarcada no es suficiente para proteger a la Fuerza Naval de Ataque Británica, a los helitransportes y

atender los pedidos de apoyo aeronaval de las tropas desembarcadas. Posiblemente estas últimas no cuenten con este apoyo.

4) La debilidad más acentuada de la capacidad anfibia británica está dada por la carencia de fuegos de apoyo adecuados, por lo que es dable esperar helidesembarcos "nocturnos" para establecer en tierra una o más bases de fuego y su protección correspondiente.

ENUNCIADO DE LA CAPACIDAD DEL ENEMIGO

"Atacar las ISLAS MALVINAS mediante asalto anfibio y helidesembar-
"co a partir del 22 de abril, con hasta tres Batallones de Desem-
"barco y fuegos de apoyo reducidos. Esta capacidad se extiende a
"las ISLAS GEORGIAS y SANDWICH utilizando efectivos menores.

APRECIACION

Dada la capacidad Anfibia enunciada para cada F.A., se aprecia que las ISLAS SOLEDAD y GRAN MALVINAS deberían ser defendidas por efectivos no menores a 2 Batallónes de Infantería reforzados con Ingenieros y Artillería de Campaña en cada una de ellas.

Debe tenerse en cuenta que el enemigo no está obligado a proseguir operaciones ulteriores y el objetivo a lograr [illegible] la conquista de las Islas, podrán empeñar en el asalto la totalidad de los efectivos sin consideraciones respecto al costo.-

3. CAPACIDAD ANTISUPERFICIE

Capacidad de Exploración:

Si bien no poseen puntos de apoyo d[illegible] alcance, [illegible] BRE-TAÑA posee gran cantidad de aviones de e[illegible] y [illegible] submarinos tipo NIMROD que tiene un radio de acción de [illegible].500 millas náuticas y 12 horas de autonomía. Se aprec[illegible]dose en la isla ASCENSION no alcanza a poder mantenerse de estación en el área.

Existe también la posibilidad de que los EE.UU. facilite[illegible] BRETAÑA información de los satélites militares de observación. En este caso, dado el escaso tráfico en la zona, la si[illegible] su-perficie sería permanentemente conocida y ac[illegible]izada.

La exploración cercana está limitada a la que pueda proveer los "SEA HARRIER" y los helicópteros.

Capacidad de Detección:

Posee radares en cantidad y ca[illegible]ar un círculo de detección que satisf[illegible]cida-des de la Fuerza. Puede complement[illegible]es con los de hasta 8/10 "SEA LYNX" y 5/6 "SEA KING" [illegible]e del dispositivo de detección.

Capacidad de Rechazo:

Se aprecia que la Fuerza puede formar un grupo de Re[illegible]isu-perficie con hasta 6 Destructores [illegible] velocidad 30 nudos y [illegible] 4 misiles EXOCET cada uno manteniendo la [illegible]. La totalidad de misiles en la fuerza se estima en 32. To[illegible]unida-des poseen enlace de datos.

Capacidad de Guerra Electrónica:

Todas las unidades poseen equipos MAE y las [illegible]dernas cuentan con contramedidas Activas. Se estima que la [illegible] tendría un to-tal de 12 equipos con capacidad de [illegible] falsos e interfe-rencias.

Los cañones de 4,5" pueden lanzar [illegible] Chaff para [illegible] y seducción. Todas las unidades poseen [illegible] Chaff para autodefensa.

Conclusión:

La Fuerza posee una elevada capaci[illegible].

FOJA 10

4. CAPACIDAD DE DEFENSA AEREA

Capacidad de Detección:

Todos los buques de la escolta poseen radares de Detección Temprana de buena performance. La gran cantidad de buques le permite adoptar dispositivos de Defensa Aérea para amenaza multisectorial. No tiene limitación para destacar piquetes radar. Puede complementar los buques con helicópteros para la detección de aviones a baja cota.

Se aprecia que con un sector de amenaza probable de 90º podrían establecer un círculo de detección de [illegible] menos de 150 millas.

Capacidad Contra Aérea:

Los 16 aviones "SEA HARRIER" embarcados, si bien [illegible] normalmente usados para la Defensa Aérea como "interceptor listo en cubierta", permiten a la Fuerza mantener hasta 4 aviones en PAC diurna y nocturna en caso de necesidad. Este avión opera normalmente solo, no por secciones lo que significa la capacidad de [illegible] por 4 estaciones.

El radio de acción de la PAC es de [illegible] millas náuticas [illegible] pudiendo incrementarse hasta 300 en [illegible].

El "SEA HARRIER" requiere control [illegible] en la interceptación hasta que pueda utilizar su propio radar. La interceptación debe ser por atrás por el tipo de misil [illegible] ("SIDEWINDER").

Capacidad de Defensa de Area:

Se aprecia que la Fuerza cuenta en total con [illegible] 7 lanzadores de misiles S.A. "SEA DART" dobles, no se consideran operativos los "SEA SLUG" de los Destructores Clase "COUNTY".

Con esa cantidad de armas adecuadamente distribuidas se puede defender un área cubierta por el Cuerpo Principal con una alta probabilidad de impacto hasta una distancia de 35 millas para aviones de alta cota y 20 millas para atacantes a baja cota.

Capacidad de Defensa Puntual:

Todos los buques de la Escuadra poseen para su autodefensa misiles de corto alcance "SEA CAT" (4.000 mts.), algunos "SEA WOLF" (7.000 mts.) y cañones A:A.

Conclusión:

La capacidad de Defensa Aérea de la Fuerza es muy elevada. Su punto vulnerable es el ataque a baja cota con previa eliminación de los helicópteros piquete ya que en ese caso la distancia de detección se reduce a 20/30 millas.

SECRETO

CAPITULO 5

FOJA 11

5. CAPACIDAD ANTISUBMARINA

Con las unidades de superfi[illegible] disponibles la protección An[illegible]al está asegurada.

Los helicópteros disponibles [illegible]dad de clasificación de con[illegible] a cierta distancia de los cortinadores.

Para determinar la eventual dis[illegible] puede efectuar el cálculo de cort[illegible]:

Nucleo:	8/9 buques.
Cortinadores:	17 buques.
Vd. operativa sonar:	18 nudos.
A.T.S.	: 4.500 yardas.
Sonar	: 184 M

Para este caso con 10/11 bu[illegible] cortina de sector, con lo q[illegible] 7 destructores como Grupo de Ataque de Superficie, piquet[illegible], unidades antisubmarinas de caza y ataque, reaprovisionamiento, etc.

SECRETO

FOJA 12

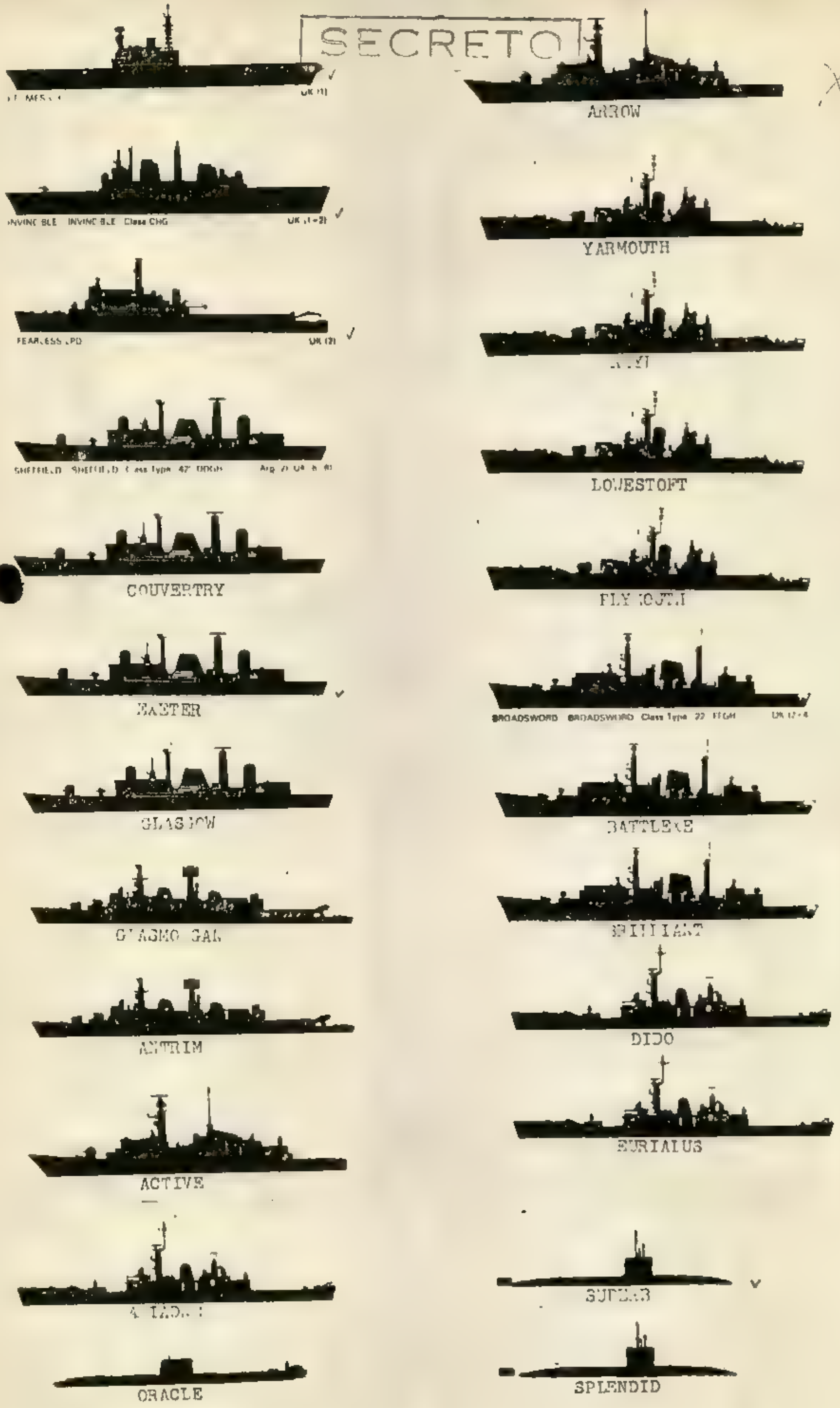
6. CAPACIDAD DE ATAQUE AERONAVAL

La composición del Grupo Aeronaval Embarcado (16 aviones "SEA HARRIER") le permite efectuar misiones [illegible] de hasta [illegible] aviones simultáneamente con bombas de 450 Kgs., es decir un total de 7.600 Kgs. de explosivo, manteniendo una escolta de 4 aviones y otros tantos en ILC. Se aprecia el alcance de una misión de ataque de hasta 250 millas náuticas.

No está confirmada la disponibilidad por parte del Grupo Aéreo de los misiles A/S "HARPOON" para ser empleados contra unidades de superficie.

SECRETO

JEFATURA DE INTELIGENCIA DEL EMGA
FOJA 13



SECRETO

UNIDADES BRITANICAS AFECTADAS AL ATLANTICO SUD

Unidades	Procedencia
Portaaviones "INVINCIBLE"	Portsmouth
"HERMES"	Portsmouth
Destructores Tipo "County"	
- "GLASMORGAN"	Gibraltar
- "ANTRIM"	Gibraltar
Destructores tipo "Sheffield" (Type 42)	
- "SHEFFIELD"	?
- "GLASGOW"	Gibraltar
- "CARDIF"	Mombaca
- "EXETER"	Belice
- "BIRMINGHAM"	Gibraltar
Destructores tipo "Weapon" (Type 22)	
- "BROADWORD"	
- "BATEAXE"	Gibraltar
- "BRILLIANT"	Gibraltar
Fragatas tipo "Rothesay" (Type 12)	
- "PLYMOUTH"	Gibraltar
- "RHYL"	Gibraltar
- "YARDOUTH"	?
- "LOWETOFT"	Gibraltar
Fragatas tipo "Leander"	
- "DIDO"	Gibraltar
- "ADRIADNE"	Gibraltar
- "EURYALUS"	Gibraltar
- "GALATEA"	Gibraltar
- "AURORA"	Gibraltar
Fragatas tipo "Amazon" (Type 21)	
- "AMAZON"	Mombasa
- "ACTIVE"	Gibraltar
- "ARROW"	

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SECRETO

Unidades	Procedencia
Submarinos (Nuclear)	
- "SUPERB"	Gibraltar
- "SPLENDID"	
Submarinos "Class Oberon"	
- "ORACLE"	?
Buque Asalto Tipo "Intrepid"	
- "INTREPID"	(puerto Portsmouth perm
- "FEAR-LESS" ?	Portsmouth
Buque Logístico	
- "SIR LANCELOT"	?
Buque Portahelicóptero (Apoyo Helicóptero)	
- "ENGLADINE"	Gibraltar
Buques pétroleros	
- "PLUMLEAF"	Gibraltar
- "GREY ROVER"	Gibraltar
- "TIDE SPRING"	Gibralter
- "APPLE LEAF"	Gibraltar
Buque de Abastecimiento	
- "FORT GRANGE"	

Portaaviones:............:	2
Destructores............:	10
Fragatas................:	12
Submarinos..............:	3
Petroleros..............:	4
Buque Asalto............:	2
Portaelicópteros........:	1
Auxiliares..............:	2
Total:	36

SECRETO

JEFATURA DE INTELIGENCIA DEL EMGA
FOJA 16

CARACTERISTICAS OPERATIVAS
DE LAS FUERZAS DE ATAQUE BRITANICAS

SECRETO

CARACTERISTICAS PRINCIPALES DEL PORTAAVIONES "INVINCIBLE".

El "INVINCIBLE" está configurado para transportar 14 aviones. Los planes actuales prevén exactamente esta cantidad y pueden almacenarse todos juntos debajo de la cubierta. Este conjunto de aviones estará integrado por nueve helicópteros SEA KING para GAS y cinco aviones SEA HARRIERS V/STOL de Caza/Ataque. En caso de emergencia es poco probable que pueda encontrarse espacio a bordo para otros tres aviones más.

Se estima que la otra posibilidad sería de 8 aviones SEA HARRIERS y 5/6 Helicópteros SEA KING.

- Medidas y velocidad.

La eslora total es de 678 piés. La longitud de la cubierta de vuelo mide 600 piés. El desplazamiento standard es de 19.500 toneladas y su velocidad de 28 nudos. Estimándose que ésta sería su velocidad máxima sostenida o "velocidad de flota" de [illegible] nudos.

- Sistemas de defensa.

Tiene un moderno sonar montado en el casco y otros tres sistemas destinados a completar una capacidad de GAS de superficie sumamente amplia, junto con un sistema de lanzamisiles SEA DART doble A.A., que no es común encontrar normalmente en un buque que transporta cazas de interceptación.

Esisten tres radares principales, el primero de los cuales es reconocible por la silueta familiar de la antena, como del tipo de vigilancia a gran distancia (tipo [illegible]). El segundo, oculto a la vista por un domo, pertenece al sistema de alcance medio, fundamentalmente asociado con el SEA DART y la defensa aérea a corta distancia. El tercero pertenece a un sistema de control de navegación de gran definición que también se utiliza en el control de helicópteros en GAS y en control de acercamiento con malas condiciones meteorológicas.

- Operabilidad.

- Ascensores.

Si uno de los ascensores falla, provocará un atascamiento del tránsito operativo debajo de la cubierta.

No obstante, los dos dos ascensores hidráulicos que posee son de nuevo diseño y muy buenos. Pueden cargar aviones por tres lados: Esta característica funciona plenamente en el de popa, pero el ascensor de proa sólo puede cargar aviones por delante y por atrás debido a la estrechez del hangar.

SECRETO

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- Operación de vuelo.

Sólo durante un acercamiento por popa controlado por radar, en condiciones meteorológicas desfavorables, la turbulencia constituiría posiblemente una interferencia significativa. Otro punto posible de interés podría ser el extremo de proa de la cubierta de vuelo donde la proa y [illegible] podrían perturbar la corriente de aire en la trayectoria de despegue del SEA HARRIER, aunque esto no parece ser lo suficientemente importante como para interferir en el vuelo, salvo en el caso de mar gruesa cuando la proa podría inclinarse salpicando la cubierta de vuelo en mayor proporción que si se tratara de una cubierta de vuelo larga.

La corriente ascendente de aire que se forma en la proa con el Ski Jamp favorece el despegue.

En condiciones de mar el cabeceo reduce la carga máxima de despegue, lo que implica reducir el radio de acción.

También en la operación de vuelo, se crean considerables desventajas por el hecho de que isla, que es larga, deja poco espacio a popa del costado de estribor [illegible] aeronaves. En realidad, sólo hay lugar para [illegible] dos "SEA KING", mientras que un "SEA HARRIER" [illegible] operar a mitad de camino entre el [illegible] y [illegible]r de despegue.

-Apreciación de su capacidad operativa.

Fundamentalmente hay algo que el "INVINCIBLE" no podrá hacer, es decir, actuar como un Portaaviones de ataque contra una Fuerza Aérea con base en tierra, contra un puerto defendido o contra unidades sofisticadas de Ejército.

Tiene una reducida capacidad de ataque por su cantidad de aviones, pero el sistema de lanzamiento tiene una exactitud equivalente al SUPER SUP, sus equipos de [illegible] permiten hacer un ataque con buenas probabilidades de no ser detectado.

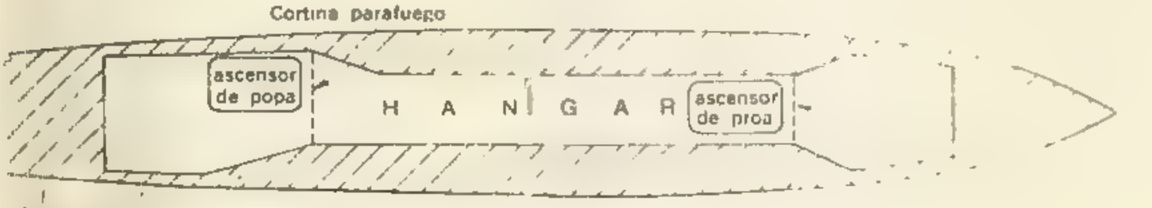
Desde 1978, esta clase de capacidad, es [illegible] tiva de la U.S. NAVY y su desaparición de las opciones abiertas al Gobierno Británico. Constituye una reducción sumamente importante para que la ROYAL NAVY se [illegible] de ciertos hechos que son de exclusivo interés para GRAN BRETAÑA y no para otra nación.

Oportunamente se manifestó que quienes insisten en que dichos intereses ya no existen, con toda seguridad deben estar equivocados y es probable que comprueben su error antes de que pase mucho tiempo....

SECRETO

...///

Es importante aclarar que este [illegible]
caer al viento. El SEA [illegible] despega [illegible], [illegible]
despega con corrida puede soportar [illegible]
viento por través.



Plano del hangar del CAH-01 (4ª cubierta) mostrando los ascensores para las aeronaves y las cortinas parafuego (No en escala)

SECRETO

DATOS OPERATIVOS DEL SEA HARRIER

Capacidades operativas del Sea Harrier
Despegue - Carrera: 165 m
Reserva aterrizaje: 5 % combustible interno

Utilización	*Configuración*	*Misiones tipo*
Defensa aérea	2 cañones 2 misiles Sidewinders 2 depósitos largables (100 galones Imp.)	1/Corrida de 100 mlls. - 30.000 pies duración 1 h. 30 m. 2/Corrida de 200 mlls - 30.000 pies = duracion 1 h. 00 m. 3/Interceptación a 2.000 pies después de un vuelo de ida a 2.000 pies y regreso a gran altura Disancia: 200 millas náuticas 1/, 2/, 3/: 3 minutos de combate
Asalto en el mar	2 misiles Harpoon internos	Vuelo de ida y regreso a altura óptima 5 minutos a 500 pies M = 0,7 Distancia: 250 millas
Vigilancia	2 depósitos largables (100 gal. Imp.)	/Ida-regreso altura óptima
Reconocimiento	1 pod reconocimiento	30 minutos a 200 pies M = 0,8 Distancia: 400 millas Corrida de 120 millas a 2.000 pies permanencia en la zona: 1 h. 00 m. Nota: mlls. = millas náuticas.

Por el tipo de cubierta del "INVENCIBLE" sumarle 1500 lb. a la carga útil total.

Area mínima de ARR 60 pies X 60 pies

Tiempo de reacción para estar en el aire después de la alarma, dos minutos.

Tiempo para llegar a 160 MN después del despegue 25 minutos.

Radar BLUE FOX (banda I) con agilidad de frecuencia.

Modos: búsqueda e interceptadión aérea; búsqueda y ataque aire superficie

Misión Interceptor: 2 Cñ. Aden 30 mm. (equipo standard)
2 Misiles Aire Aire AIM-9L SIDEWINDER

Misión Reconocimiento: Cámaras montadas en el fuselaje (útil en buen tiempo), a 45.000 pies de altura alcance oblicuo 20 MN.

Misión Ataque contra buques: Bombas (hasta 1.000 lb.)
(NOTA: Todavía no está en servicio. Se estima que para ataque solo posee bombas) (Cohetes
(2 Misiles Radar Activo HARPOON o SEA EAGLE (antes P3T) (no confirmado)

Carga externa total 5.000 lbs. - 5 estaciones - despegue corto.
Aterrizaje
ARR - Siempre Vertical

Transición al Vuelo estacionario : 30 seg.

Consumo combustible Vuelo Estacionario 80 Kg/minutos.

Velocidad a media altura : Mach 0.8

350/450 nudos

Consumo a baja altura 110 Kg./min.

Vigilancia electrónica y visual- volando a baja altura: 1 hora 70.000 km2. aprpximadamente.

Con sonoboyas o torpedos aéreos, llega a una zona de contacto a 30 millas del buque en 6'. Operado con los helicópteros alivia de esta manera a aquellos para que solo se ocupen del sonar.

En despegue vertical, carga útil igual [illegible] toneladas.

En despegue corto, sumarle 1.500 lb.

El empuje dirigido puede proporcionar una rápida desaceleración en vuelo recto nivelado y dirigiendo las toberas hacia abajo y girando en redondo, el avión puede virar muy ajustadamente mientras disminuye la velocidad. El avión atacante se encontrará repentinamente tirando por encima de su blanco, o durante una caída lenta, será incapaz de mantenerse a la par de su blanco.

Un tubo de T.V. de visión diurna proporciona al piloto información de vuelo así como información radar, mientras que en el tablero exhibidor electrónico nuevo y de mayor [illegible] o de SMITH INDUSTRIES maneja la entrada de datos provenientes de la computadora digital para puntería.

Un radar de navegación DECCA DOPLER 72 alimenta una plataforma de referencia de altitud autoaliniante FERRANTI controlada por computadora para proporcionar una precisión en la navegación equivalente a los sistemas inerciales de la generación anterior.

Posee el sistema de guiado UHF

Posee TACAN

Transpondedor de banda India.

Los receptores de alarma de los radares pasivos están montados en los bordes de ataque de las aletas de popa y cono de cola.

Transreceptor multicanal PLESSEY PTR 377 de U/VHF con [illegible] auxiliar D 403 M.

En la carlinga un panel especial permite el control de los misiles AIM-9L SIDEWINDER , uno sobre cada estación externa y misiles aire superficie, como el SEA EAGLE (antes P3T) y el HARPOON sobre las estaciones internas de las alas.

SECRETO

JEFATURA DE INTELIGENCIA DEL EMGA
FOLIO 23

///..3

Posee zonas de la estructura reforzadas para transportar bombas cohetes, tanques de combustible, equipos de interferencia electrónica y equipos de reconocimiento.

SECRETO

Servicio Operacional del Avión "SEA HARRIER"

Las dos escuadrillas operacionales de aparatos V/STOL Sea Harrier de las Fuezzas Aeronavales británicas han recibido ya todos sus aviones y se hacen periodicamente a la mar en sus respectivos portaaviones: la Nº 800 en el "HERMES" y la Nº 801 en el "INVINCIBLE"

El "Sea Harrier" ha cumplido de manera satisfactoria, en sus ejercicios realizados recientemente, con las misiones de interceptación, reconocimiento y ataque para las cuales fue concebido.

Posee características excepcionales para el combate aéreo y ofrece una inigualada flexibilidad operacional para ciertos aspectos de las acciones navales.

Las escuadrillas operacionales 800 y 801 se componen de cinco aviones cada una.

MISION

La Misión principal del Sea Harrier es la defensa aérea. Para la tarea secundaria de lucha antibuque, sólo se dispone de momento de bombas de 455 kg. y de los dos cañones Aden de 30 mm montados en el avión. Está previsto instalar más adelante soportes de fijación para cohetes de 50 mm, pero ninguna de estas armas parece suficientemente eficáz contra los grandes buques soviéticos. Este inconveniente será remediado con la puesta en servicio del misil de trayectoria rasante P3T Sea Eagle de BAe. cuyas pruebas han comenzado a bordo de un Sea Harrier.

Para misiones de defensa aérea, el armamento del Sea Harrier se compone de dos cañones Aden de 30 mm alojados en barquillas ventrales y dos misiles AIM-9G Sidewinder fijados en los soportes alares externos.

Para el reconocimiento, el Sea Harrier está provisto del radar Ferranti Blue Fox y una cámara fijada oblicuamente a estribor.

Puesto que la escuadrilla embarcada comprende sólo cinco aparatos, éstos operarán generalmente de manera aislada, salvo en ciertos casos, tales como operaciones de bombardeo en los que podríá ser necesario empeñar dos o cuatro aviones.

En misiones de defensa aérea, el Sea Harrier se empleará para realizar intercepciones puntuales dentro de un dispositivo más complejo. En cubierta estos aparatos serán mantenidos en estado de alerta o proporcionarán ya cobertura aérea en la supuesta zona de llegada de la amenaza. Suponiendo incluso que el Sea Harrier fuera incapáz de hacer otra cosa más que interceptar y destruir las aeronaves enemigas que se acerquen a la formación naval, esta capacidad es considerada suficiente por la Marina británica para justificar la puesta en servicio del aparato. Naturalmente el Sea Harrier ofrecerá también otras posibilidades.

Las intercepciones de los Sea Harrier no serían efectuadas solamente basándose en las informaciones procedentes de los sistemas de vigilancia de su portaaeronaves, sino también en las proporcionadas por otros buques o aviones (los E-2C Hawkeye de la Marina estadounidense. AEW Nimrod de la RAF y los E-3A AWACS).

El armamento aire-aire del del Sea Harrier se limitaba al misil AIM-9G Siderwinder.

Sus equipos de CME (un radomo de exploración frontal instalado casi en el tope del plano de deriva, y otro de exploración hacia atrás montado en la tobera de escape), son de tipo mucho más perfeccionado que el simple detector de radares que poseen los Harrier de la RAF, ya que proporcionan datos precisos sobre la naturaleza y la dirección de las emisiones radáricas enemigas. Ello permitirá al piloto interceptar un avión utilizando muy poco su radar Blue fox, reduciendo así el peligro de ser descubierto por los detectores del enemigo.

Los Sea Harrier de la escuadrilla Nº 801 del "INVINCIBLE" efectuaron principalmente operaciones de defensa aérea (asociados con los F-14 del Eisenhower), pero llevaron igualmente a cabo algunas misiones de reconocimiento o ataque contra objetivos de superficie cuando la amenaza aérea era pequeña. En determinada fase de las maniobras, la escuadrilla Nº 801 logró incluso mantener una cobertura aérea durante 90 horas consecutivas, lo que constituye una hazaña tratándose de una unidad de sólo cinco aparatos y siete pilotos y mereció los elogios de la Marina estadounidense.

El "INVINCIBLE" no fue diseñado especialmente para llevar aviones Sea Harrier, lo que explica en parte que el trampolín de la cubierta de vuelo tenga una inclinación de sólo 7º y que, en ciertos aspectos, sus sistemas no sean los ideales para las operaciones de defensa aérea. No obstante ha sido demostrado que los equipos del buque pueden guiar inicialmente los Sea Harrier hacia sus objetivos, efectuando el piloto de cada avión la fase final de la intercepción con ayuda de su radar Blue Fox.

Maniobrabilidad

La maniobrabilidad excepcional del Sea Harrier en combate evolucionante es debida principalmente al sistema de orientación del vector empuje, utilizable en vuelo normal que permite al piloto efectuar brusca deceleraciones y cambios de postura o de trayectoria imprevisibles por el adversario.

La orientación del vector empuje durante el combate evolucionante es tanto más útil cuando que el piloto puede servirse de ella a voluntad. Si encontrara en dificultad en esta configuración, le bastaría con anular el ángulo de deflexión de las toberas para volar instantáneamente en condiciones normales. Así pues, incluso teniendo poca experiencia, podrá enfrentarse en combate evolucionante con aparatos de mayor potencialidad teórica en virajes cerrados.

Operaciones del Sea Harrier desde portaaeronaves

El límite de velocidad del viento laterales actualmente de 15 nudos en el despegue, pero pasará sin duda a 20 nudos a raíz de los resultados satisfactorios obtenidos en las pruebas realizadas a bordo del "HERMES".

///...3

Despegue

En las misiones de intercepción, el tiempo mínimo para despegar en caso de alerta es teoricamente de dos minutos (debido a la necesidad de alinear la plataforma de navegación por inercia de dos giroscopios), pero la Marina admite en la práctica un tiempo de tres minutos, con lo que el piloto dispone de 30 seg. para colocarse el correaje de seguridad y poner en marcha el motor, 2 minutos para alinear la central de navegación y 30 seg. para efectuar las últimas verificaciones. Puesto que las misiones suelen ser llevadas a cabo por un solo aparato, no se ha intentado acortar el intervalo entre dos despegues sucesivos, que es actualmente de unos 10 seg.

Aterrizaje

Ni el "INVINCIBLE" ni el "HERMES" poseen radar especial de aproximación, pero ese método puede aplicarse con el radar de navegación Tipo 1006.

SECRETO

"SEA KING" (COMANDO)

-Biturbo táctico (Turbinas Rolls Royce Gnome H-1400-1 de 1590 HP eje)

2 Tripulantes.

Transporta 21 hombres con equipo completo o su peso equivalente.

Autonomía 276 millas.

Equipado con:

Sistema automático Mando de Vuelo NEWMARK MK-31.

Equipo Navegación MARCONI AD-580.

Radar de Vigilancia MEL tipo AW-391.([illegible])

Radiogoniómetro automático MARCONI AD-370S.

Conjunto ILS COLLINS 51.

Brújula SPERRY.

Armamento de acuerdo al requerimiento del cliente.

"LYNX HAS MK-2"

Se agregan especificaciones.

HELICOPTERO "LYNX HA. MK-1"

Versión Naval Antisubmarina para búsqueda y Combate de Avanzada, para ser transportadas en Fragatas.

Designación H.AS.Mk-2)

Equipo Electrónico:

Radar de búsqueda y transponder de banda X.

Armamento y Equipo Operacional:

La versión naval puede desempeñar diversos roles, pero posee equipo especializado para sus tareas primarias. Para el rol de Guerra Antisubmarina incluye torpedos autodirigidos MK-44 ó armas opcionales montadas externamente una a cada lado de la cabina y mecanismo de detección clasificación retráctil, provisto de capacidad de almacenaje interno para equipo operacional clasificado. Radar para búsqueda en superficie FERRANTS SEASPRAY, con misiles auto-guiados LACCI-384 para atacar aviones livianos de superficie; a su vez pueden utilizarse misiles AS.12 o misiles similares filo-guiados juntamente con un sistema de visualización óptica estabilizada. La versión naval también se adecua para funiciones de rescate en porta-aviones y transporta un montacarga de rescate para uno o mas hombres-rana.

Pesos

Peso Operativo

Fletador: 5.913 libras (2.682 kg)
Búsqueda y Rescate: 6.506 libras (2.951 kg).
Combate: (4.AS.12) 6.765 libras (3.068 kg).
Anti-Submarino, (con armas) 7.285 libras (3.304 kg).
Peso máximo de despegue: 8.550 libras (3.873 kg).

Performance:

Velocidad máxima de crucero a Nivel del mar: 160 kds.(184 millas/p/h; 296 km/p/h.
Velocidad máxima de crucero a 16.000 pies (4.575 m): 100 kds. (115 millas p.h; 185 km p/h).
Velocidad económica de crucero para alcance máximo: 138 kds (159 millas p/h; 256 km p/h).
Velocidad de Resistencia a nivel del mar: 70 kds (81 millas p/h; 130 km p/h).
Radio regular a nivel del mar con una tripulación de 2 personas y 5% de reservas:
Anti-Submarino: (sin reservas) 156 mn (179 millas; 289 km).
Anti-Submarino: (con 60' de reservas) 88 millas náuticas (101 millas; 163 km.).

SECRETO

CARACTERISTICAS OPERATIVAS DEL AVION "NIMROD".

Fundamentalmente basado en el avión comercial COMET IV, de HAWKER-SIDDELEY, el NIMROD fue diseñado para combinar las ventajas de una elevada altura y velocidad de traslado, con una adecuada capacidad de carga y maniobrabilidad a baja altura, operando en guerra antisubmarina, y a su vez ser apto para reconocimiento o ataque a buques de superficie

Cuando se necesita, pueden pararse 2 de los cuatro motores, para ampliar su autonomía. El NIMROD puede volar y elevarse con un solo motor en marcha. En el compartimiento destinado para bombas puede transportar una amplia gama de armas así gran cantidad de sonoboyas y boyas de referencia, que se dejan caer por el sector trasero del fuselaje presurizado.

Además de sus capacidades antisubmarinas y de reconocimiento, el NIMROD puede utilizarse para efectuar fotografías diurnas y nocturnas. Cuando estos aviones fueron originalmente provistos a la RAF, tenían la alternativa de una capacidad misilística de superficie. Esto se ha anulado pero puede reactivarse en caso necesario

Puede transportar hasta 16 personas más, en su función de traslado, o hasta 45 despues de haber retirado el equipo en el sector de popa del fuselaje.

Sistema electrónico y equipo.

Sistema indicador de rumbo: DECCA DOPPLER tipo 67 M/Marconi E 3 para navegación de rutina, con mecanismo de inversión provisto por un sistema de girocompás duplicado SPERRY GM7, que opera junto con un display.

Navegación táctica y selección y emisión de información: a través de un sistema de navegación/ataque MARCONI que se vale de una computadora digital. Una estación de display táctico provee en forma continua información actualizada sobre la posición de los aviones, indicando el rumbo actual y los anteriores; la posición de las sonoboyas, el radio de acción de las mismas, marcaciones MAE, señalizaciones MAD, contacto de radar y marcaciones visuales. Información sobre rumbo puede ser exhibida automáticamente a los pilotos, a traves de un sistema de observación de vuelo; a su vez, la computadora puede ser acoplada al piloto automático, para permitirle al navegador táctico dirigir el avión a un objetivo de interceptación determinado, punto de lanzamiento de las armas o cualquier otro punto en la representación táctica.

VELOCIDAD DE CRUCERO	475 NS
RADIO DE ACCION	2500 MS
AUTONOMIA	12 HS

SECRETO

JEFATURA DE INTELIGENCIA DEL EMGA
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CARACTERISTICAS DE ARMAS

SECRETO

ARMAMENTO BUQUES INGLESES

- MISILES

1. EXOCET - Superficie-Superficie

2. SEA WOLF - Superficie-Aire
3. SEA DART - Superficie-Aire
4. SEA CAT - Superficie-Aire
5. SEA SLUG - Superficie-Aire

6. SEA SKUA - Aire-Superficie

- CAÑONES

1. 4,5" Mk-8
2. 4,5" Mk-6
3. Cañón Antiaéreo 40/70
4. Cañón Antiaéreo 40/60
5. Cañón Antiaéreo 20mm Oerlikón

- TORPEDOS

1. Torpedo Mk-48 (21 pulgadas)
2. Torpedo Mk-46
3. Torpedo Mk-44
4. Torpedo Mk-24 (Tiger-Fish)

- LANZABOMBAS

1. Limbo
2. IKARA

SECRETO

FOJA 32

[illegible]ISIL SU[illegible]ERFICIE-SU[illegible] [illegible] "EX[illegible]".

Es un arma muy efectiva, dific[illegible] [illegible] inter[illegible] [illegible]r.
Su sistema de guiado es inercial [illegible] primer[illegible] part[illegible] de su reco
rrido y autoguiado por radar acti[illegible] [illegible] fase fi[illegible] de búsqued
y seguimiento.

Sus características princi[illegible] [illegible] las [illegible]ntes:

1. Misil contenedor:

   Longitud: 5,40 m.
   Ancho : 1,24 m.
   Alto : 1,13 m.
   Peso : 1.750 Kgs.

2. Misil:

   a. Dimensiones:

      Longitud : 5,[illegible] [illegible].
      Diámetro fuselaje : [illegible],[illegible] [illegible].
      Envergadura : 1,[illegible] [illegible].

   b. Pesos:

      De lanzamiento : [illegible]50 [illegible].
      Cabeza de combate : [illegible]65 [illegible].

3. Autodirector: Radar activo mono-pulso, con estabilización ho
   rizontal del lóbulo de emisión. Frecuencia: Banda I (810 GHz

4. Cabeza de combate: Ti[illegible]o [illegible] [illegible]ación [illegible]ica, con efect
   de soplo.
   Espoleta: De percusión con re[illegible]ardo, y [illegible] [illegible]idad comandad
   por autodirector.

5. Motor cohete a combustible sólido. Tiempo de combustión 108,
   segundos.

6. Velocidad de crucero: 315 m/s (Mach 0,93)
   Tiempo para recorrer: 38 kms. : 120 segundos.

7. Alcances: Según tabla de cálculos. [illegible] Km.

8. Alturas de vuelo: Fase inicial: [illegible] a [illegible] mts.
   Fase crucero: 15 m.
   Fase final : 2.[illegible]/4. 2/7 m.

9. Parámetros de graduación:

SECRETO

	∅	L	DBU	AFV
Pequeño	± 2º 5	± 750 m.	5 kms.	[illegible] m.
Mediano	± 6º 25	± 1812 m.	8 kms.	4.[illegible] m.
Grande	± 10º	± 2750 m.	12 kms.	7 m.

∅ = Ancho angular ventana.

L = Profundidad ventana.

DBU = Distancia búsqueda antes del blanco.

AFV = Altura final de vuelo.

Tirando sin distancia, L = 8.000 m, a partir del momento de apertura del autodirector.

10. Intervalo de fuego para lanzamiento en salva de los dos misiles de una misma banda: 4 a 6 seg.

11. La fase de FUEGO es IRREVERSIBLE.

12. La fase de PREPARACION es reversible, pero para no disminuir la confiabilidad del misil se requiere esperar más de 15 segundos para que se disipe el calor generado por la sobrecarga que se produce al poner en funcionamiento el giróscopo vertical.

13. La fase de PUNTERIA es reversible, aunque en ella queda destrincado el giróscopo axial, lo que incrementa la probabilidad de averías.

MISIL SUPERFICIE AIRE MEDIO ALCANCE "SEA SLUG"

Es un misil supersónico de combustible sólido con cuatro boosters.

Alcanza una velocidad máxima de Mach 2,5 y una velocidad promedio durante el vuelo de Mach 2,2. Tiene una longitud de 6 mts., un diámetro de 0,41 cms. y una envergadura de cola de 1,50 mts. Su guiado se efectúa por señales de control del radar Marconi Tipo 901 (sistema Beam Riding). No posee cabeza activa.

Su alcance máximo de diseño es de 24 millas para un blanco volando a 50.000 pies. El intervalo entre salvas es de 25,6 segundos y puede batir un sólo blanco por vez ya que tiene un sólo director.

Su cabeza de combate lleva una cantidad considerable de alto explosivo y espoleta de proximidad. Se desconoce el radio de acción.

El diseño de este misil data del comienzo de la década del cincuenta y sus componentes electrónicos son todos a válvula. No posee contra-contramedidas para evitar interferencias o engaño electrónico.

Si bien algunas publicaciones asigna a este misil capacidad superficie - superficie, dado el tipo de guiado que posee, la interferencia por retorno de lóbulos laterales en el mar que puede esperarse, la dificultad de adquisición de blancos navales por el radar de guiado y el tipo de cabeza explosiva, se aprecia que esta capacidad es muy reducida.

El alcance operativo sobre aeronaves a mediana altura se estima en las 12/15 millas, disminuyendo rápidamente con la altura del blanco

Considerando la antiguedad de su diseño, la vejez de sus componentes y los problemas de mantenimiento existentes, se le puede estimar una probabilidad de impacto inferior al 30% por misil.

En general los comentarios escuchados en las fábricas inglesas relacionadas con este misil y de los usuarios en la marina inglesa, coinciden en afirmar que se trató de un desarrollo básico, de poco exito, cuyo mayor mérito fue proveer experiencia para el posterior desarrollo del "SEA-DART".

SECRETO

JEFATURA DE INTELIGENCIA DEL EMGA
FOJA 35

MISIL SUPERFICIE-AIRE DE CORTO ALCANCE "SEA CAT"

Misiles de corto alcance destinados a la defensa AA cercana.

Son guiados por una combinación de control visual y radar provisto por el sistema de armas GWS 22.

Sus características principales son:

Alcance efectivo: 5.000 mts. aproximadamente.
Cabeza de combate: 18 Kgs. de H.E.
Espoleta : De proximidad

Si bien se trata de un sistema confiable y de bajo costo, su efectividad ha quedado reducida a valores muy bajos para las distancias de lanzamiento de las armas aire-superficie actuales.

SECRETO

ARTILLERIA

1. Cañón de 4.5" Mk-6

Torre de dos cañones de doble propósito y tiro rápido VICKERS de carga semiautomática. Está controlada por radar y sigue las órdenes del Director MRS-3, mediante un sistema de transmisión electro-hidráulico.

Sus características principales son:

Alcance máximo : 20.000 yardas.
Alcance eficaz : 16.000 yardas.
Volumen de fuego : 20 tiros/cañón/minuto
Máxima elevación : 80 grados.
Peso del proyectil : 25 Kg.

2. Cañón de 4.5" Mk-8

Alcance máximo : 24.000 yardas.
Elevación máxima : + 55º
: − 10º
Cadencia de Fuego : 24 tiros por minuto
Peso del tiro completo: 80 libras.
Peso del Proyectil : 46 libras.
Velocidad de ronza: : 40º/seg.

Puede disparar granadas: A) Luminosas.
B) Radar Ecco (señuelos por radar)
C) Convencionales V.T.

Capacidad Total : 450 tiros.

3. Cañón Antiáereo Boffors 40/70.

Velocidad de dirección : 85º/seg.
Velocidad de elevación : 45º/seg.
Límites de elevación : + 90º
− 10º
Velocidad de fuego : 300 tiros por minuto.
Velocidad del proyectil : 1.005 seg
Alcance : 12 Km.

4. Cañón Antiaéreo Boffors 40/60.

Elevación : 80º
Velocidad de fuego : 120 tiros/min.
Velocidad de proyectil : 830 mts/seg.
Alcance máximo : 10 Km.
Alcance táctico : 3 Km.

5. Cañón Antiaéreo 20 mm. Oerlikón

Elevación : − 15º
+ 60º
Alcance: Blancos aéreos : 1.500 mts.
Blancos navales: 2.000 mts.
Velocidad de fuego : 1.000 tiros/min.
Velocidad de proyectil : 1.050 mts./seg.

SECRETO

TORPEDOS

1. Torpedo Mk48 (21 pulgadas)

Características

Longitud: 5,8 m.
Diámetro: 21"
Peso : 1.600 Kg.
Veloc.Máxima: 93 Km/h.
Alcance Máximo: 46 Km.
Profundidad Máxima: 914 M.

Torpedo altamente sofistificado que puede ser operado con o sin comando guiado. Una vez lanzado hace búsqueda del blanco, lo localiza y lo ataca y tiene capacidad de re-atacar varias veces si ha fallado en intentos anteriores.

2. Torpedo Mk46 (Modelo 1)

Características

Longitud: 2,59 m.
Diámetro: 32,4 cm.
Peso : 230 Kg
Velocidad: --
Alcance : 46 Km (estimado)
Patrón de búsqueda: múltiple
Peso carga impulsiva: 44 Kg.

3. Torpedo Mk44 (Torpedo liviano para ser lanzado desde helicópteros y unidades de superficie)

Características

Propulsión	: Eléctrica
Calibre	: 12,75 Pulgadas
Longitud	: 2,56 mt. (aproximadamente)
Peso	: 233 Kg.
Velocidad	: 30 nudos
Recorrido	: 6 minutos
Distancia	: 6.000 yardas

Profundidad de Operación: 50 a 1.000 pies.
Sistema de búsqueda: Helicoidal, fija o serpenteante.
Sistema de detección: Activo.
Rango de adquisición: 1.000 yardas.

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SECRETO

4. Torpedo Mk.24 -(Tiger Fish)

Características

Largo : 6,46 mts.
Diámetro : 53,3 cm.
Peso : 1550 Kg.
Velocidad: Dual - alta o baja, seleccionable
Alcance : 32 Km. (estimado)
Espoleta : De impacto y aproximación.
Propulsión: Eléctrica

Calificado como torpedo de alta performance.

"LIMBO" - Mortero lanzabombas de profundidad.

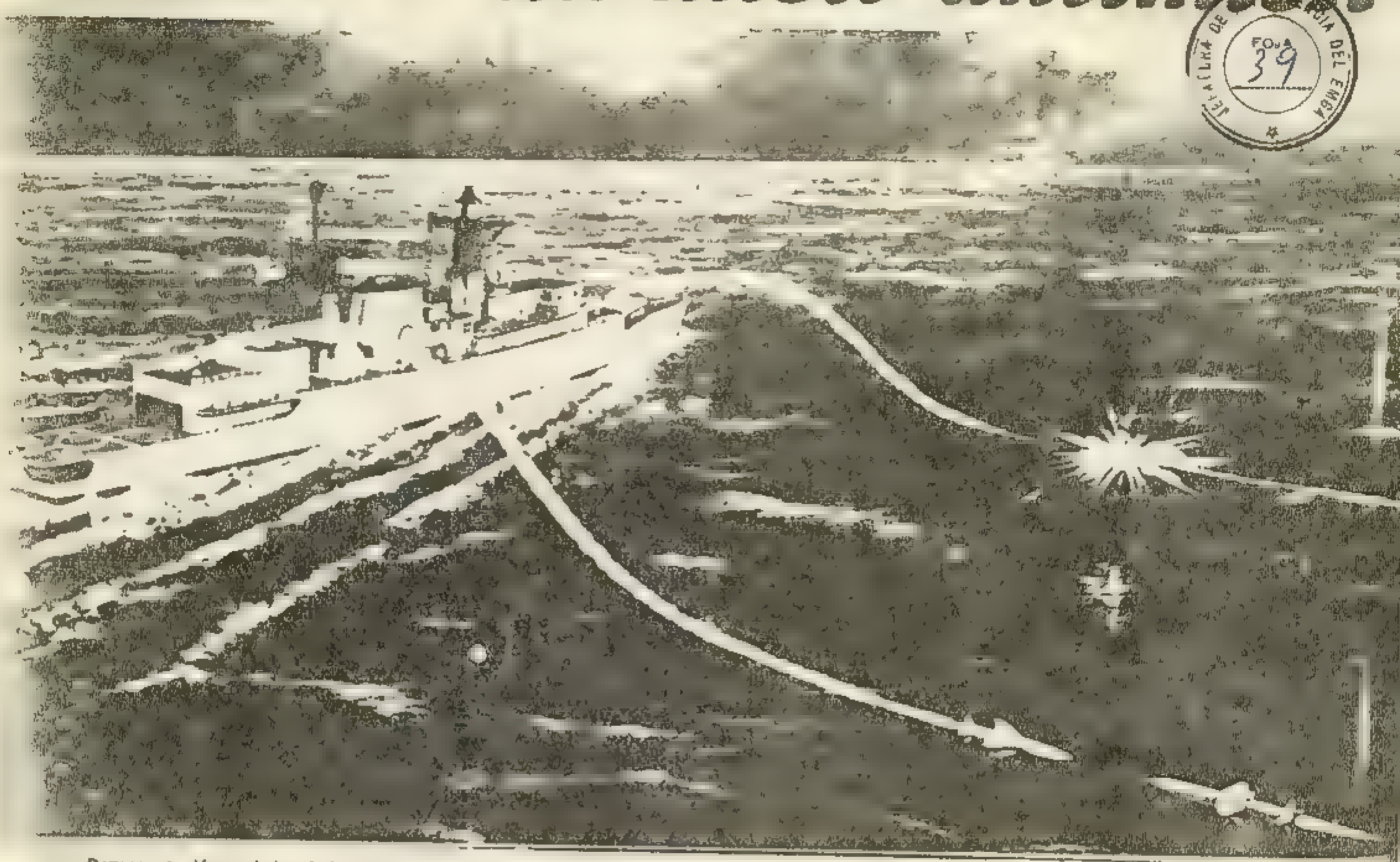
Sistema mortero superficie-submarino de medio alcance.
Un sistema sonar provee la posición del submarino a un predictor que ~~compu~~puta la elevación y la dirección .
El mortero dispara tres bombas las que pueden ser explotadas a profundidad variable.
El peso del proyectil es de 200 kg. y el alcance es de 1.000 a 2.000 metros.

Afeusa
AÑO – III – NOS – 28-29 –

SECRETO

el SEAWOLF: un misil antimisil

JEFATURA DE ... DEL EMGA
FOJA 39



Representación artística de la intercepción simultánea de dos SSM por el "Sea Wolf"

Por Mario PAYA ARREGUI

Cuando cierto día el destructor israelí "Eliath", un viejo "Z" ex-británico, fue alcanzado y hundido por varios SSM "Styx", todos los sistemas de armas defensivos de las marinas occidentales quedaron automáticamente anticuados. Inmediatamente, y con carácter de urgencia, varios países encargaron a sus respectivas industrias el desarrollo de armas capaces de diluir la nueva amenaza.

En Inglaterra, basándose en un estudio iniciado en 1964 –*Confessor*–, el Almirantazgo publicó un requerimiento para un sistema de armas antimisil. Al poco tiempo, los contratos de desarrollo y producción fueron asumidos por British Aircraft Corporation (misil), Marconi RSL (sistemas electrónicos y equipos de radar) y Vickers (lanzador).

Las tres empresas citadas y una comisión de la Royal Navy culminaron el proceso de definición del sistema estableciendo para éste las siguientes especificaciones.

– Capacidad todo tiempo.
– Tiempo de reacción mínimo.
– Alcance corto y distancia de tiro mínima muy reducida.
– Secuencia de detección y disparo completamente automática.
– Capacidad de intercepción contra blancos muy pequeños que se desplacen a velocidades superiores a Mach 2 y a baja altura.
– Número de misiles listos para el disparo suficientes para desbaratar un ataque de saturación.
– Volumen reducido en orden a instalar el sistema en unidades de pequeño tamaño.
– Recarga preferentemente manual.

El desarrollo y construcción del primer prototipo completo del sistema llevó unos ocho años, aunque los primeros disparos del misil se realizaron ya en 1970 en los polígonos de Aberporth (Inglaterra) y Woomera (Australia).

Los primeros disparos con el sistema completo y desde un buque tuvieron lugar a partir de 1976 en la fragata *Penelope* F-127 (una *Leander* modificada).

Los primeros buques en montar el *Seawolf* fueron las nuevas fragatas inglesas Tipo 22 (Clase *Broadsword*), que cuentan con dos lanzadores séxtuples recargados manualmente. Se planea instalar el sistema en las fragatas Tipo 21 (las *Amazon)*, configurándose en este caso en un lanzador séxtuple de recarga manual o en cuatro dobles de recarga automática, aunque parece ser que este proyecto ha chocado con problemas de sobrepeso en estos buques. Por último, es también intención de la RN el dotar a las 10 *Leander* más modernas con el *Seawolf*, aunque se ignora qué configuración se adoptará.

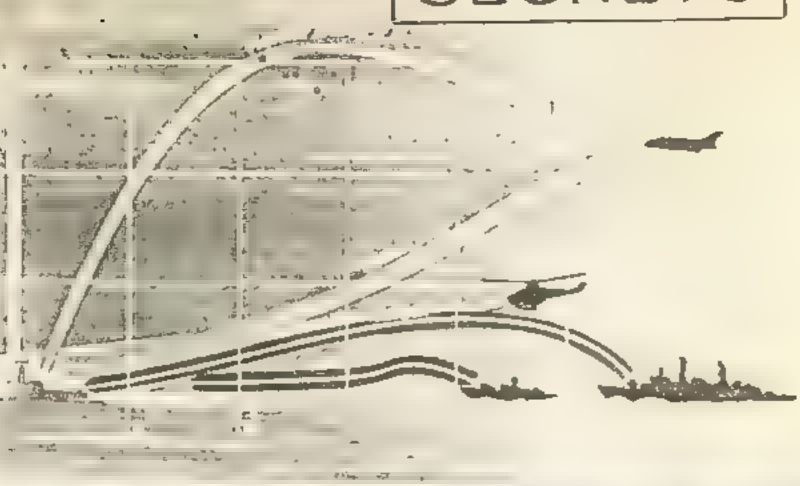
En cuanto a la exportación, ésta ha sido nula hasta el momento, pero es necesario recordar que el sistema lleva poco tiempo en servicio y que Inglaterra carece de los medios de *persuasión* comercial que uno de sus competidores dispone. Es triste que siendo el *Seawolf*, con mucha diferencia, el mejor sistema antimisil en ... sea adoptado como *estándar* ... OTAN simplemente porque no es de construcción americana.

El *Seawolf*, en su versión GWS 25 (que la adoptada por la RN), se subdivide en dos subsistemas principales: el complejo electrónico (radares, computadoras, etc.) y el conjunto de fuego (lanzador y misil).

COMPLEJO ELECTRONICO

El complejo electrónico es la parte más ...plicada e importante del sistema, habiendo sido desarrollado por Marconi. Se subdivide en cuatro elementos: radar de vigilancia y detección, radar de seguimien-

SECRETO



Esquema que representa las diferentes amenazas a que puede hacer frente el "Sea Wolf". De arriba a abajo: avión Mach 2 en picado, ASM balístico a Mach 1,4, SSM de tipo crucero, SSM en vuelo rasante

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to, equipo de televisión y sistemas de computación.

El radar de vigilancia es un Tipo 965 que en realidad son dos, ya que integra un radar Tipo 968 (banda S) y un Tipo 967 (banda L) tipo Doppler. Los dos radares están fundidos "espalda contra espalda" en una antena en forma de pan, que incluye además un interrogador IFF.

La antena gira a 30 r.p.m. y está servoestabilizada, lo cual significa que los datos son renovados cada dos segundos (lo que no es precisamente un valor impresionante) y que puede detectar los blancos tanto a bajo como elevada altura en cualquier condición meteorológica.

El Tipo 968 es utilizado para vigilancia de superficie y de baja altura, habiendo sido desarrollado tanto él como su colega por Marconi. El Tipo 967 tiene como misión la detección automática de pequeños misiles a cualquier altura, presentando una gran capacidad de discernimiento entre ecos reales y ecos falsos provocados por la superficie marina o por ECM.

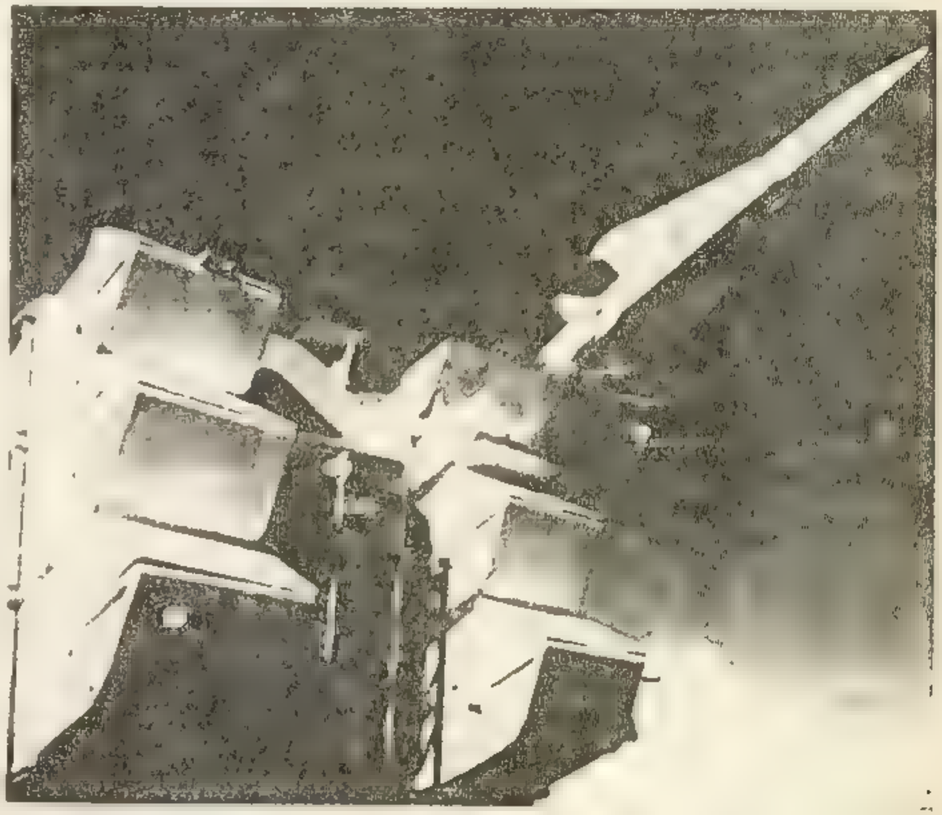
El radar de vigilancia, una vez confirmada una detección, envía toda la información obtenida al "cerebro" del sistema: un computador Ferranti FM 1600B cuyas funciones son el análisis de las amenazas, la selección de las más graves y la asignación de éstas a los radares de persecución es de un grado de precisión máximo, de tal forma que éste "adquiere" al blanco designado casi instantáneamente.

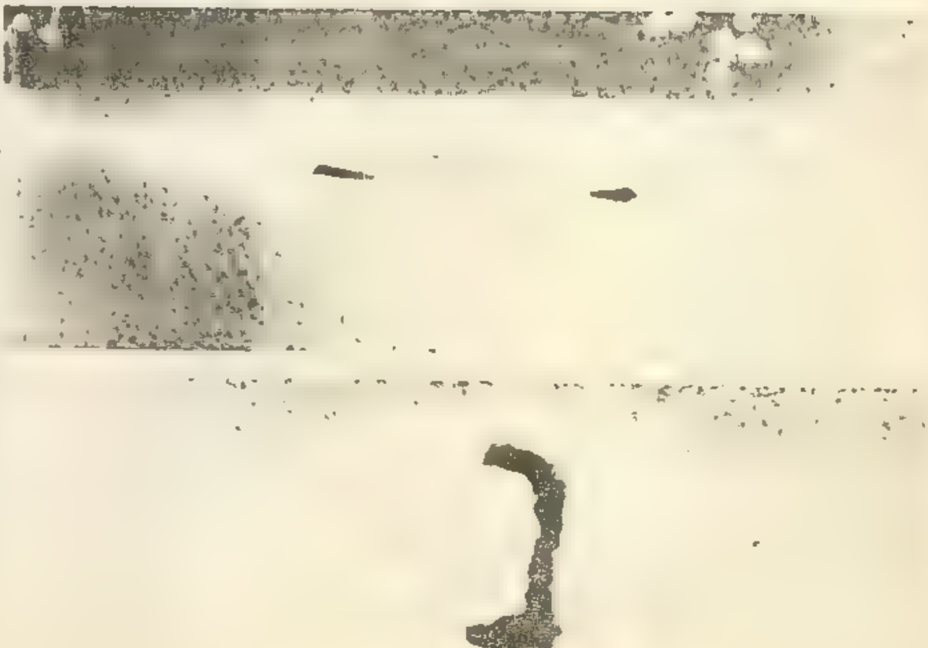
- *Radar de seguimiento:* El radar de persecución y guiado es un Tipo 910 también desarrollado por Marconi, teniendo capacidad para guiar dos *Seawolf* simultáneamente. El 910 tiene un disco principal y dos auxiliares que emiten las órdenes de corrección elaboradas por el método EAT (corrección de ángulo electrónico), siendo también del tipo Doppler.

La técnica de seguimiento y guiado es del tipo CLOS (siglas en inglés de corrección de la línea de puntería). La elección de este sistema correspondía a la exigencia de que el misil había de ser lo suficientemente pequeño como para ser manejado manualmente, dándose el caso de que el CLOS hace innecesaria la instalación en el misil del autodirector y del computador.

El Tipo 910 cuenta con un sistema de giroestabilización y unos servocontroles tan efectivos que es casi imposible la pérdida de contacto con el blanco y los misiles, incluso con la mar más picada ...

Instante del lanzamiento de un "Sea Wolf" desde la fragata "Penelope"

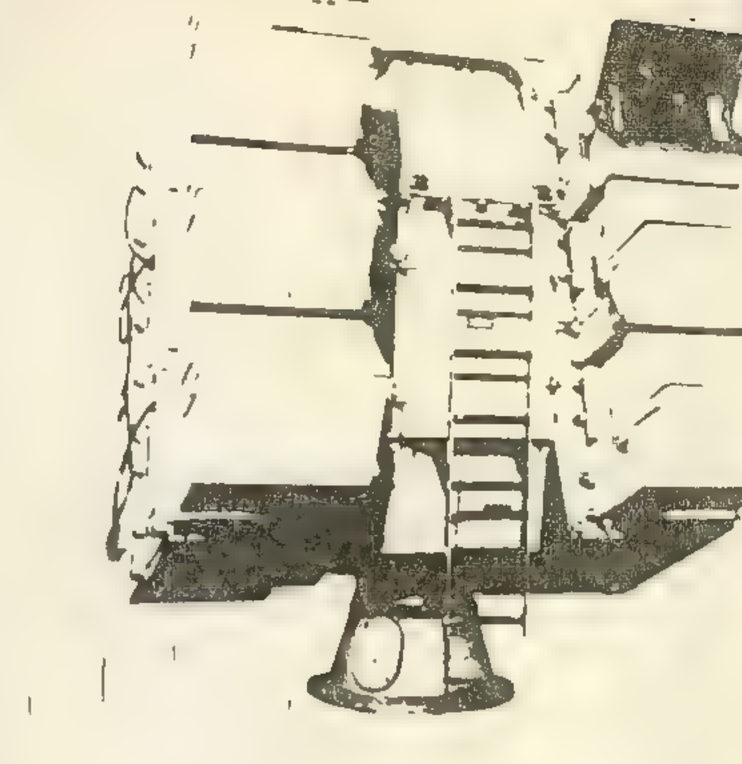




Secuencia de la destrucción de un blanco bisónico "petrel" por un "Sea Wolf".

SECRETO

el SEAWOLF: un misil antimisil



Vista frontal del lanzador séxtuple Vickers

pacidad de resistencia a los ecos falsos y a las ECM es asimismo muy elevada gracias al empleo del efecto Doppler.

Aún así, si alguno de esos agentes resultara demasiado intenso, el *Seawolf* dispone para esa eventualidad de un equipo de televisión de conexión automática, a través del cual la intercepción es controlada manualmente por un operador. El equipo de TV ha sido desarrollado por Marconi-Elliot.

CONJUNTO DE FUEGO

Comprende el lanzador, el equipo de recarga y el misil.

El lanzador se integra en seis celdas rectangulares montadas sobre un pedestal de movimiento horizontal y vertical, efectuándose su control automático y simultáneamente con el radar de persecución. Cada celda es hermética a la intemperie, permitiendo un período de interrevisión del misil muy prolongado.

La elevación y derivación del lanzador se realiza por medio de unos servomotores similares a los del extraordinario *Sea Dart*, alcanzando unas prestaciones de orientación mecánica inmejorables

El lanzador acoge también la Unidad de Disparo de Misiles que tiene como objeto la indicación de los misiles disponibles, la selección del misil más adecuado en orden al arco de tiro, la emisión de las órdenes de fuego y la actuación del seguro.

En la version GWS 25 la recarga de las celdas se realiza manualmente mediante un raíl acoplado a la parte trasera de aquéllas. Este sistema presenta el inconveniente de ser algo lento y dificultoso en mal tiempo, obligando además a la dotación a exponerse a posibles agentes ABQ.

En cuanto al misil, el diseño de éste es de lo más convencional, pues presenta un cuerpo cilíndrico de morro cónico al que se acoplan cuatro alas en delta cortadas, situadas con otras tantas superficies de control más atrasadas.

De morro a cola el misil contiene los siguientes dispositivos: espoleta de proximidad/contacto (EMI); seguro y dispositivo de amartillado (EMI); cabeza de combate de fragmentación (14 kg.); módulo de guía (giróscopos, baterías, receptor de órdenes, autopiloto); motor.

Como ya he señalado más arriba, la necesidad de mantener el peso y las dimensiones del misil dentro de unos niveles reducidos, empujaron al equipo de diseño a adoptar un sistema de guía CLOS. La ventaja de este sistema es que diversos equipos se pueden montar en el buque lanzador en vez de instalarlos directamente en el misil, solución que aparte de ahorrar mucho espacio en el misil resulta muy económica.

El motor es un *Blackpac* de tipo bifásico, desarrollado por British Aerojet y RPE. En una primera fase, durante dos segundos, este motor desarrolla su empuje máximo acelerando el misil hasta una velocidad superior a Mach 2, variando durante el resto del vuelo el empuje de tal forma que aquel valor permanezca constante

Los gases de escape son expulsados a través de una tobera venturi, en los bordes de la cual se encuentran las bengalas que facilitan el seguimiento del misil en el guiado por TV. Las superficies de control son actuadas por medio de gases procedentes de la combustion

En la punta de las alas se encuentran las antenas de recepción de las ordenes de vuelo codificadas

FUNCIONAMIENTO OPERACIONAL DEL SISTEMA:

Lo frecuente y normal es que la secuencia de intercepción se inicie con la detección por parte del conjunto radar Tipo 965 de uno o varios OVNI (en el sentido menos peyorativo de la palabra) en vuelo hacia el buque. Tres giros de radar (5 segundos) bastan para determinar automáticamente los parámetros del blanco (velocidad, altura, deriva distancia) y para que el IFF determine si se trata de un elemento hostil.

Si es así, todos los datos acumulados son simultáneamente transmitidos al computador 1600B, que inmediatamente determina cuál es la amenaza más grave de acuerdo con una tabla previamente programada. El computador determina entonces en base a los datos enviados por la MFU, cuál es el radar de seguimiento y el lanzador (si cuenta el buque con más de uno), más adecuados para hacer frente al ataque (un segundo más).

Cuando el radar seguidor y el lanzador han sido ya seleccionados, los parámetros del blanco son transmitidos al primero que se alineará automáticamente en deriva e iniciará la búsqueda en elevación. El computador del radar de seguimiento calculará entonces la angulación del lanzador asignado, de tal manera que los misiles entren inmediatamente de ser disparados en el campo de emisión del radar.

El misil (o los misiles si se prefiere disparar una salva) es disparado cuando el blanco se encuentra todavía fuera de alcance, con el objeto de que la interceptación se produzca a la mayor distancia posible del buque

Durante el vuelo de los misiles, el Tipo 910 emite dos ondas diferentes, una onda estrecha alineada con el blanco que es la que dirige los *Seawolf* hasta aquél y otra onda amplia que se encarga de dirigir los misiles recién disparados hacia la banda estrecha, cuidando también de seguir la deteccion del blanco en el caso de que éste escape de aquélla

El cálculo de las correcciones de vuelo de los misiles se realiza a traves de la Unidad de Configuración de Guiado (GSU), que en base a la información enviada por el radar de seguimiento elabora los datos de alineación del misil con el blanco, siendo transmitidos a aquel por microondas

En el caso de que el objetivo vuele de-

Interesante fotografía que nos permite comparar los tamaños relativos de los aviones blanco "Petrel" y "Monarch" ... misil "Sea Wolf" un obús de 114 mm ... un marinero de la Royal Navy

Consola de guiado manual por TV del Sea Wolf

masiado bajo o de que las ECM cieguen el radar de persecución, se conecta automáticamente el sistema TV. En esta configuración la interceptación es controlada manualmente por un operador, que lo único que ha de hacer es mantener el blanco en el centro de su visor de puntería.

VARIACIONES SOBRE UN MISMO TEMA

Aunque el *Seawolf* GWS 25 presenta unas características prácticamente insuperables, ocurre que su peso, volumen y consumo de energía requieren su instalación en buques de un desplazamiento no inferior a unas 3.000 Tm.

Para hacer frente a este problema se han propuesto múltiples soluciones, tendiendo casi todas ellas a sustituir el voluminoso conjunto del radar de vigilancia por otro más simple.

Así, la versión *Seawolf* Psi es prácticamente igual a la GWS 25, con la diferencia de que sustituye todo el complejo de control del 965 por cualquier otro sistema que el cliente elija. El método de empleo sigue siendo el mismo, con la diferencia de que el proceso de detección y evaluación dependerá ahora de las características del nuevo radar. Esta versión puede ser instalada en buques de hasta 2 000 Tm.

La versión *Delta* presenta lanzadores dobles de nuevo tipo y recarga automática, incluyendo además un radar de persecución y un equipo de TV nuevos desarrollados por Marconi.

La versión *VM-40* utiliza el radar de la misma designación derivado del conocido sistema holandés STIR. El VM-40 es prácticamente invulnerable a los ecos falsos por lo que hace innecesario el empleo de un televisor. Este sistema se puede instalar en buques de tan sólo 500 Tm

Versión un tanto curiosa es la denominada *Omega*, que emplea como radar de vigilancia el *Blinfire*, que fue desarrollado originalmente para el sistema *Rapier*

CONCLUSIONES

El *Seawolf* es indudablemente uno de los mejores sistemas de defensa antimisil en servicio en el mundo y los experimentos realizados así lo confirman

En efecto, en las pruebas realizadas en 1976 se dispararon 70 *Seawolf* contra misiles ...ónicos volando a ras de las olas, completándose la intercepción con éxito en más del 85 por ciento de los casos. Este porcentaje, ya de por sí admirable, se convierte en extraordinario si tenemos en cuenta que los experimentos se realizaron con misiles de experimentación carentes de... ¡cabeza de combate!

Por si esto fuera poco, en varias ocasiones se ha conseguido interceptar proyectiles de cañón de 114 mm. en vuelo, proeza que hasta ahora no se había conseguido con ningún otro sistema de armas.

Buena parte de estos éxitos se deben al funcionamiento totalmente automático del sistema, que anula posibilidad de error humano. Al mismo tiempo, el dispositivo de autodiagnóstico de averías y la construcción modular del sistema asegura una operatividad casi continua de éste.

Sin embargo, en mi opinión, al *Seawolf* se le pueden objetar dos defectos: en primer lugar, la recarga manual del sistema implica que en el caso de un ataque de saturación el buque se encontraría pronto con sus lanzadores vacíos, aunque también es cierto que este problema no existe en otras versiones. En segundo lugar, me temo que el método de transmisión de órdenes a los misiles —por microondas— resulte bastante vulnerable a las ECM en el futuro, con lo que la validez del sistema disminuirá.

A pesar de estos defectos, creo que no es aventurado afirmar, sin embargo, que el *Seawolf* seguirá siendo un buen sistema antimisil en los años 80 ■

FICHA TECNICA

Definición: sistema automático, misilístico, antiaéreo de corto alcance
Radares: Tipo 965 (Tipos 967 y 968). Tipo 910 Doppler
Computador Ferranti FM 1600B
Televisor: Marconi-Elliot
Lanzador Vickers MK-25 Mod. 0
Misil
- Dimensiones. largo, 190 cm.; diámetro, 18 cm.; envergadura, 55,9 centímetros
  Peso al lanzamiento: 82 kg
  Cabeza de combate: 14 kg
  Alcance, 6,5 km
  Velocidad superior a Mach 2
- Guiado. CLOS

SECRETO

Radar de Seguimiento 910

Radar de seguimiento de impulsos doppler, monopulso, en Banda I, de frecuencia fija.

Banda de frecuencias	8.600 - 9.300MHz
Anchura de banda	1,5° AZ x 1,6° EL
Potencia de cresta	14,3kW
Potencia media	286W
Longitud de impulso	0,75 - 1,87μs
f.r.p.	10,7 - 26,7kHz
Cifra de ruido del receptor	10dB
Rechazo de imagen	35dB
Nivel de lóbulos laterales	-18dB EL) -21dB AZ) dentro de ±10°
	->35dB más allá de ±10°
Ventanas de adquisición	±250m
	±150m/s
	±0,75°

La Tabla 3 da la lista de las principales características disponibles de los radares.

RAN 10S	SPQ 2D	910
AGILIDAD DE FRECUENCIA	AGILIDAD DE FRECUENCIA	GRAN POTENCIA
COMPRESION DE IMPULSO		MONOPULSO
FRP ESCALONADA		IMPULSO DOPPLER
RECEPTOR "DICKE-FIX"		FRP VARIABLE
CODIFICACION DE SEÑAL		ANCHO DE IMPULSO VARIABLE

TABLA 3
CARACTERISTICAS DE LOS RADARES

... radar with coded transmissions
Guidance method: By control of tail surfaces
Propulsion: Solid-propellant sustainer with four wrap-around solid-propellant boosters
Warhead: High-explosive with proximity fuze
Missile length: 6m
Missile diameter: 41cm
Range: Probably better than 45km. Targets engaged at heights above 15,000m in trials.

OPERATION

Fully automatic magazine handling and loading arrangements. Electrically driven twin launcher. Targets are designated to the system in three co-ordinates by radar. The system automatically tracks the target and points the launcher. When the target comes within range the missile is fired and intercepts the target using beam-riding guidance techniques. Typical radars are the RN Type 965 (1560.253) for primary long-range surveillance, Type 277 for height finding, and the Type 901 which is the Seaslug tracking and illuminating radar. HE warhead with DA and proximity fuzes. Four wrap round boosters.

DEVELOPMENT

Development started in the early 1950s. Prototype trials carried out in HMS *Girdleness* during late 1950s. First fitted in County class destroyers in 1961.

Seaslug [illegible]

STATUS

Mk 1 system fitted in HM Ships *Devonshire*, *Kent* and *London*. Mk 2 system fitted in HM Ships *Glamorgan*, *Fife*, *Norfolk* and *Antrim*. Obsolescent.

MANUFACTURERS

British Aerospace Dynamics Group, Manor Road, Hatfield, Hertfordshire AL10 9LL, England. Subcontractors include:

Sperry Gyroscope – flight controls. Marconi Space and Defence Systems – missile guidance. Vickers Shipbuilding Group – magazine handling gear and launcher.

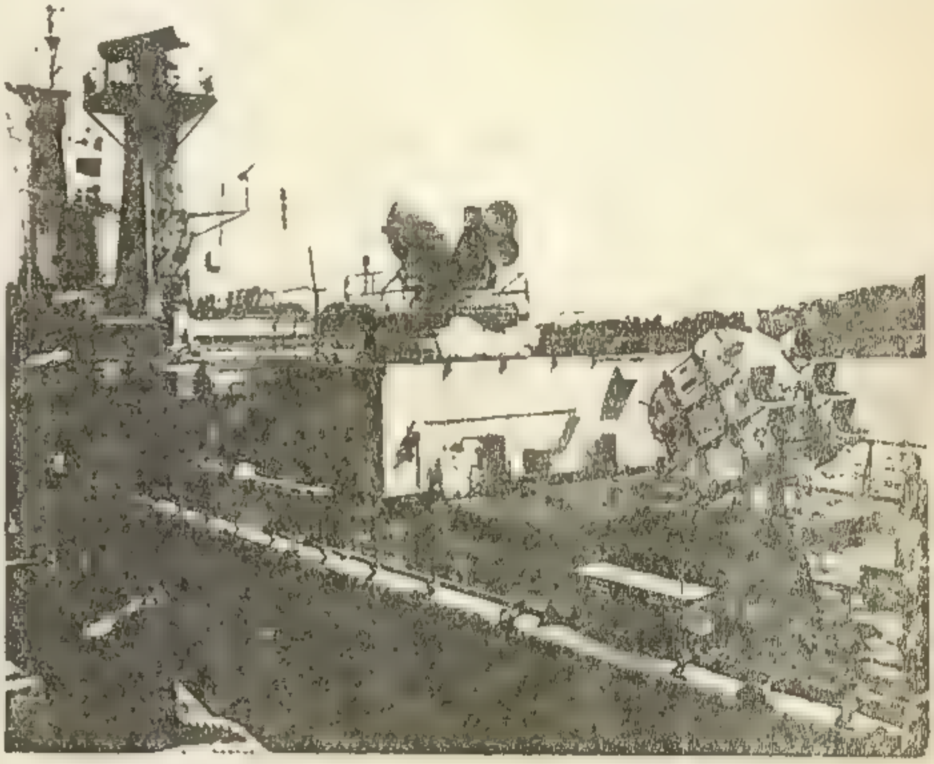
[redacted]

SEAWOLF SURFACE-TO-AIR MISSILE

Seawolf is the missile used in the Royal Navy's short-range self-defence missile system, GWS25. The system is designed to provide rapid reaction defence against both aircraft and anti-ship missiles. It is capable of installation in new and existing small escort vessels down to about 3000 tons, full load, as well as in larger vessels. A lightweight derivative of the GWS25 system, known as Seawolf VM40 has been studied for fitting in much smaller vessels of corvette size or possibly as little as 800 tons.

The Seawolf missile employs line-of-sight guidance with radar differential tracking or television, both with radio command. Speed and manoeuvrability characteristics are suitable for the engagement of small Mach 2 missile and aircraft targets under severe weather conditions and sea states.

Seawolf launch during MoD trials



Seawolf trials installation aboard HMS Penelope. Type 967/968 dual search radars are on mast to left, Type 910 tracker group centre and Mk25 launcher on right

VM.40 tracker radar system for Seawolf

The complete GWS25 system comprises the following units:

Air and low-air surveillance radars, Type 967 and [redacted]
Radar trackers, Type 910 and TV trackers
Command transmitter
Launcher and firing system
Missile and handling frame
Data handling
Guidance Shaping Unit
Operations Consoles
Magazines

The Type 910 tracking radar is produced by Marconi and is described more fully in Section Three of this book (1562.253). The TV system is produced by Marconi-Elliot. The Type 967 and Type 968 surveillance radars provide both high and low cover and also are produced by Marconi (1561.253). They are of modern design and incorporate features for air target detection up to high elevation angles as well as high performance against low-level and surface targets. Comprehensive precautions against sea and land clutter, as well as natural and man made interference are incorporated, as is IFF.

The line-of-sight to a target is established by either the tracking radar or the TV system. Error signals proportional to Seawolf missile deviations from this datum are derived from the differential tracking radar or the TV system, and these signals are processed by a guidance shaping unit. Coded correction signals for missile guidance are produced and transmitted by microwave command link to bring the missile to the required flight path. In the GWS25 system the data processing required to interpret the tracking data and calculate the correct command signals is based on the use of a Ferranti FM 1600B computer (1433.063), which has been adopted as a standard.

A multiple launcher developed by Vickers Shipbuilding Group Ltd bears the designation Mk 25 Mod 0 and consists of six rectangular launch-tubes disposed in two banks of three, one on each side of an az/el mounting. Reloading is manual, presumably to avoid the complexity and, particularly, the weight of an automatic system which might undesirably limit the number of ships which can carry the full Seawolf system. The launcher is separate from the tracking radar. High slewing rate and pointing accuracy are important features of the Seawolf launcher which is equipped for fully automatic firing sequence, with command override.

The Seawolf missile weighs approximately 80kg at

SEA WOLF MISIL

SECRETO

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launch, is about 2m in length and has four fixed wings and four moving tail fins. A solid booster motor is stated to give minimal launch drop and speed is quoted as being in excess of Mach 2. Successful techniques employed in Rapier (2424.131) have been incorporated, and no on-board test or repair facilities for missiles are called for. The HE warhead is provided with both proximity and contact fuzing.

OPERATION

For the successful interception of an incoming anti-ship missile great accuracy and an extremely short reaction time are required of the system. To achieve this it is arranged that, once a target has been identified as hostile, all subsequent phases of the launch and guidance operation will be carried out automatically and without further manual control.

Other relevant features include the ability to fire salvoes, immediate readiness capability maintained over long periods, and extremely fast data handling facilities in all parts of the system.

Automatic radar guidance is the normal operating mode, with TV tracking by an aimer for low angle of sight and surface target engagement.

VARIANTS

As mentioned above, a number of alternative configurations of the Seawolf system have been evolved to yield versions appropriate to different classes of vessels and operational requirements. The same basic missile is employed but various combinations of alternative launchers and sensors are used to produce the systems named ... Seawolf/Delta and Seawolf Omega.

Seawolf VM 40. In late 1977 it was revealed that the Royal Navy is studying another derivative of the original GWS 25 Seawolf system for possible fitting in ships down to 800 tons in size. This version of the system could employ the same Type 967/968 back-to-back surveillance radar unit but provided it had an adequate performance and sufficiently high data rate to match that of the rest of the system, a different equipment could be used for this purpose.

In place of the GWS 25 system's Type 910 tracking radar, the Anglo/Dutch VM 40 tracker system derived from the Hollandse Signaal apparatus ST R tracker used in the Dutch Standard frigates for Sea Sparrow guidance would be employed. Potential advantages are more recent design and a four tons an appreciable saving in weight ... an ability to track accurately the low ... targets by radar without the aid of a television ...

A further significant saving in system weight w... come from the substitution of a lighter weight ... twin round launcher ... launcher used in the GWS 25. In the new design a rapid power loading system is provided to feed the missiles to the launcher from a ready use magazine below. This can be loaded fast enough to match the engagement cycle of the remainder of the system.

DEVELOPMENT

Feasibility studies were carried out in the mid-1960s under the code name Confessor and project definition began in February 1967. The full development programme was started in July 1968.

STATUS

HMS *Penelope* was used as a trials ship. By mid-1976 more than 60 rounds had been fired in high and low-level tests against a variety of targets, with more than 85 per cent of engagements counted as successful. Sea evaluation of the production prototype was completed at the end of 1977 and production is in hand for fitting the new RN Type 22 class of frigates.

MANUFACTURERS

Missile: British Aerospace Dynamics Group Ltd.

Radar: Marconi Radar Systems Ltd.

Television: Marconi Elliott Avionic Systems Ltd.

Computer: Ferranti Ltd.

Launcher: Vickers Shipbuilding ...

2446.231

SLAM CLOSE RANGE WEAPON SYSTEM

The initials SLAM stand for Submarine Launched Air Missile system. This system has been developed by Vickers to meet the need of submarines for an effective short-range defence against surface craft and helicopters.

For target engagement the system uses the Blowpipe (2409.131) missile for which a special multiple launcher is provided. This carries six missiles clustered around a central electronics enclosure which contains part of the missile control equipment, television system, and gyro subsystem for launcher stabilisation. A GRP (Glass Reinforced Plastic) Pressure Vessel built into the submarine's fin conceals and protects the SLAM armament. A periscopic mast enables the launcher to be fully deployed from the stowed position within a few seconds.

Control room equipment consists of an operator's display console, electronics cubicle which houses the power supplies, and launcher control electronics. An additional feature is a trainer simulator which can be plugged into the display console to give the operator at sea training against simulated targets. Built-in test facilities are provided to enable routine servicing and rapid system checks to be carried out without the need for specialist personnel.

OPERATION

One operator is required. Target acquisition is by means of attack periscope, the launcher being automatically aligned with the target in azimuth when the launcher mast is raised. The operator then seeks the target's elevation and tracks it on his TV screen, controlling the launcher system by means of a thumb button controller which enables him to maintain the target in the screen centre. He then selects and fires the missile. When the missile is fired, the thumb button controller is disconnected from the launcher control circuits. The missile is automatically gathered on the line of sight and appears on the TV screen, at which point the operator controls its flight with the same thumb button controller. The launcher is able to continue tracking the target ... Missile range is at least 3000m and may be greater against slow moving or stationary targets because less energy is required for manoeuvring. The warhead weighs 2.2kg and is detonated by impact or proximity fuzes.

DEVELOPMENT

The system was developed by Vickers initially to be suitable for use on the 'Oberon' class submarines but it has been adapted for use in other types of submarine. SLAM can be fitted ... submarines or retrospectively.

The SLAM system has been included as part of the weapons fit for patrol submarines being offered by several European shipyards.

STATUS

Sea trials on HM Submarine *Aeneas* were successfully concluded in November 197... lished the accuracy and effectiveness ... SLAM installations have been made in a number of submarine types.

MANUFACTURERS

System: Vickers Shipbuilding Group Ltd, Barrow Shipbuilding Works, PO Box 6, Barrow-in-Furness, Cumbria LA14 1AB, England.

Missile: Short Brothers Ltd, ...agh, Belfast BT6 9HN, Northern Ireland.

SLAM installation in submarine fin

2612.231

SEAFOX NAVAL POINT DEFENCE SYSTEM

Seafox is a new ... point defence system pro... Seafox uses salvoes of large, unguided but very accurate rockets to defeat these threats. It is con... a system control comp...

SECRETO

JEFATURA DE INTELIGENCIA DEL EMGA
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A Proven Capability

SECRETO

GWS 25/Seawolf is the Royal Navy's latest close-range air-defence missile system. It is in production and ship-fitting has already commenced. The system has completed very successful shore evaluation trials and is currently undergoing an extensive sea firing programme in the Leander class frigate HMS Penelope. It is the first RN weapon system to have been designed from the outset to handle automatically all phases of an engagement, from initial target detection to target .estruction. The Type 22 anti-submarine frigates will be the first class of ship to be fitted with the GWS 25/Seawolf system. The first of class, HMS Broadsword, is currently fitting out at Messrs. Yarrow's yard in Glasgow, and will enter service at the end of the 1970's.

Further ship-fitting is planned, and both the Contractors and the Ministry of Defence are actively engaged in marketing the system overseas.

SECRETO

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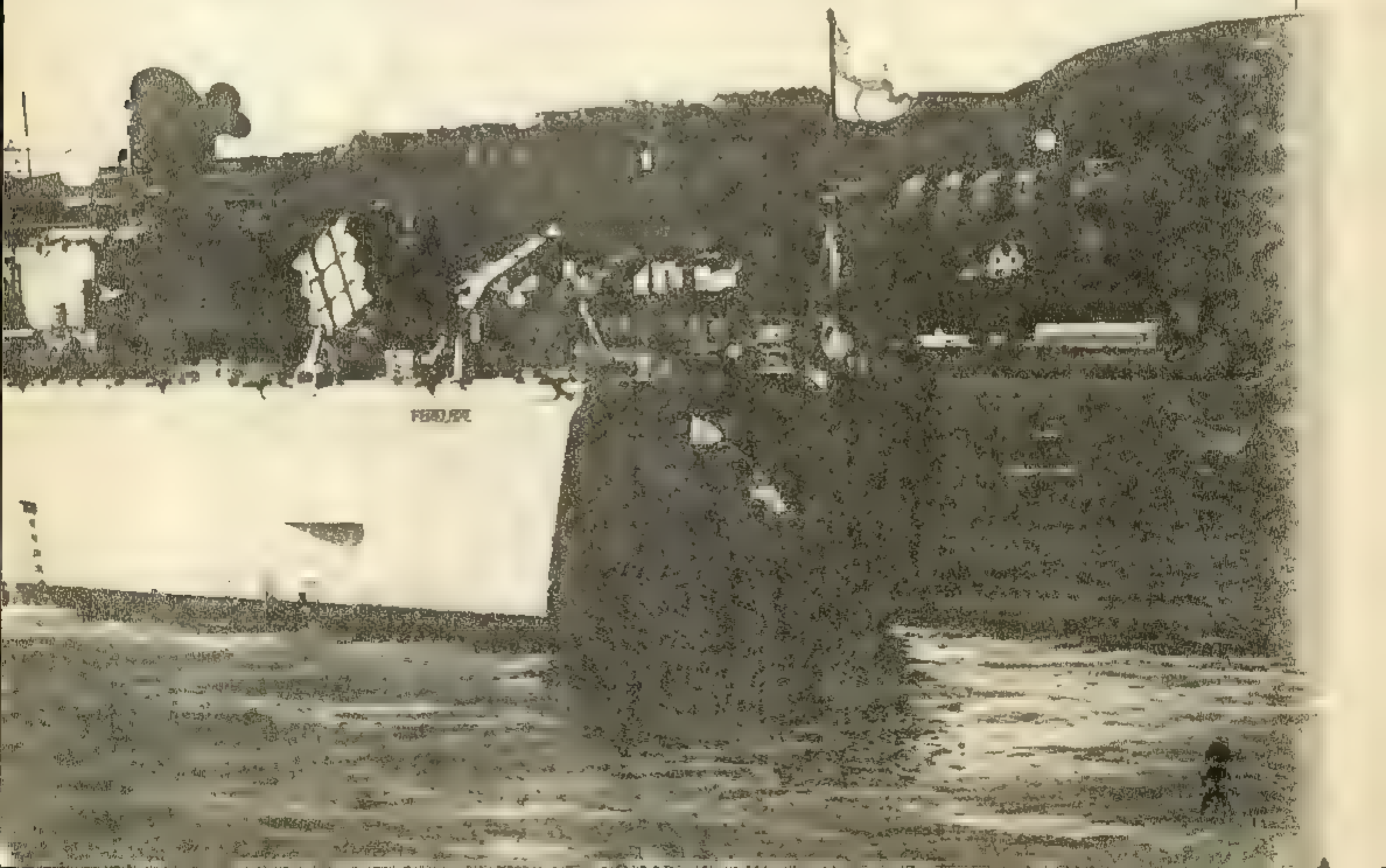
GWS 25/Seawolf is a point defence anti-missile missile system designed to give ships of frigate size and above an effective means of defending themselves against the missile and close air and surface threats of the 1980's. The system is capable of operating effectively under very severe environmental conditions, and its fully automatic response to threatening targets ensures that no incoming missile or other target will go unengaged due to human fallibility. The system has the very high reliability which must be associated with fully automatic performance if the latter is to be of any practical value.
The history of GWS 25/Seawolf starts in 1964 when the Royal Navy issued a Staff Target for an anti-missile system capable of being fitted in frigate hulls.
Studies carried out by contractors and Ministry establishments under the code name 'Confessor' showed that the requirement could best be met by a system using a command-to-line-of-sight missile, a pulse doppler radar differential tracker and a pulse doppler air surveillance radar. In 1967, as a result of the 'Confessor' studies, the Royal Navy published its Staff Requirement for an anti-missile system. Within a short time the British Aircraft Corporation had been nominated as missile contractor followed by Marconi Radar Systems Limited as the contractor for the overall ship system with its associated radars, and Vickers for the launching system. Project definition began soon afterwards and the commencement of the full development programme followed approval of the Naval Staff Requirement in 1968. Firing trials took place at Aberporth in the U.K. and at the Woomera range in Australia from 1970 to 1976. Trials of the system radars fitted in HMS Penelope commenced in 1975 and continued during 1976. Full missile firing trials from the ship started in 1976.
The main items of the system are the surveillance radar – Type 967, and the radar tracker – Type 910, made by Marconi Radar Systems, the television tracker made by Marconi Elliott Avionics Systems, the launcher made by Vickers and the Seawolf missile and its associated Guidance Shaping Unit, both made by the British Aircraft Corporation. Both the radars and the television tracker have associated computers, made by Ferranti. Another Ferranti computer is incorporated in the Guidance Shaping Unit.

Below: *GWS 25/Seawolf installation aboard HMS Penelope.*



The Threat

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FOJA 49

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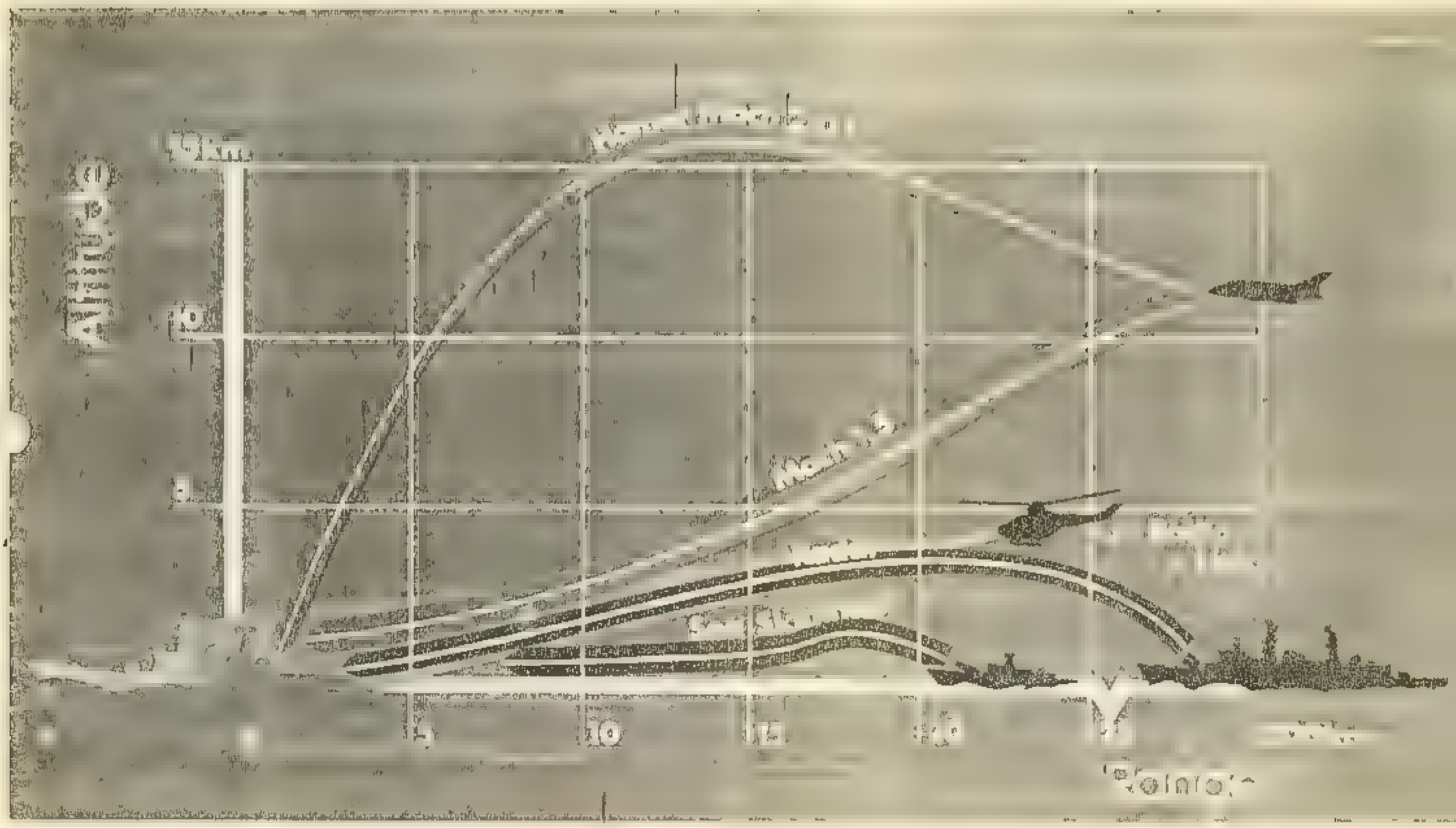

In recent years, naval exercises have increasingly shown that the anti-ship missile now represents the major threat to the survival of surface warships of all types. Developments in the field of submarine and aircraft-launched missiles, and in missile technology, notably in the case of sea-skimming missiles, now mean that an attack can take place with little or no warning, and with the launch vehicle never coming within range of the target's self-defence armament. As well as the sub-surface and air-launched threats, there exists a very considerable surface threat as few warships of corvette size and above are built today without an armament of anti-ship missiles.

Modern missiles can fly at speeds in excess of Mach 2, and their trajectories can vary from a straight-in approach a few metres above sea level to a steep dive at an angle well in excess of 45°. They may also carry out terminal manoeuvres designed to optimise their striking angle and render the task of self-defence weapons more difficult. Their radar echoing areas are often as small as a fraction of a square metre. The threat that they represent can only be countered by a very sophisticated anti-missile system designed from the outset to take account of the full range of hostile missile capabilities. Such a system is the GWS 25/Seawolf.

The Naval Staff Requirement for the system was first published in 1967, and has since been kept up-to-date to take account of developments in the missile field, including the

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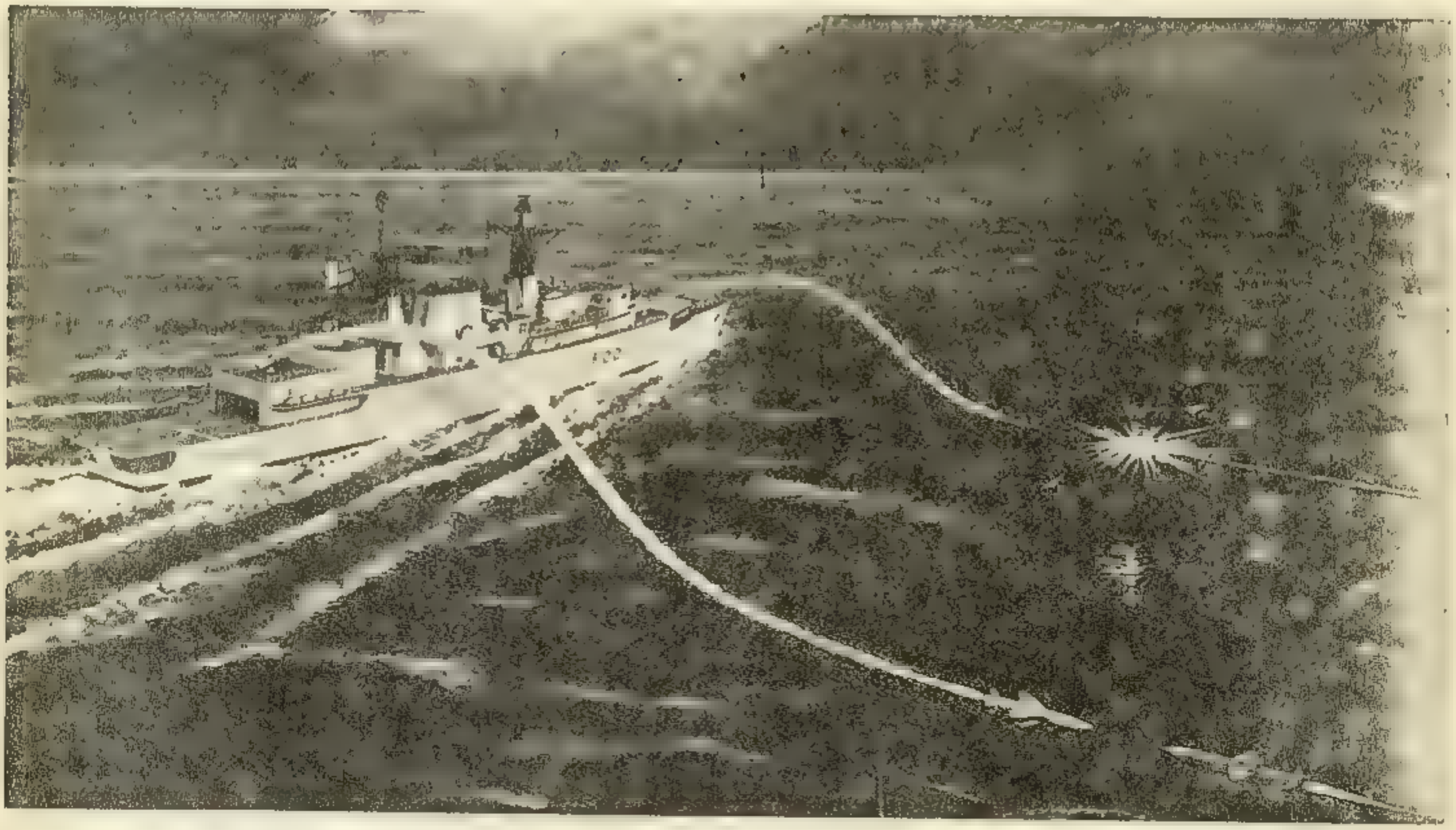


introduction of sea-skimming missiles. The following are the principal points:-

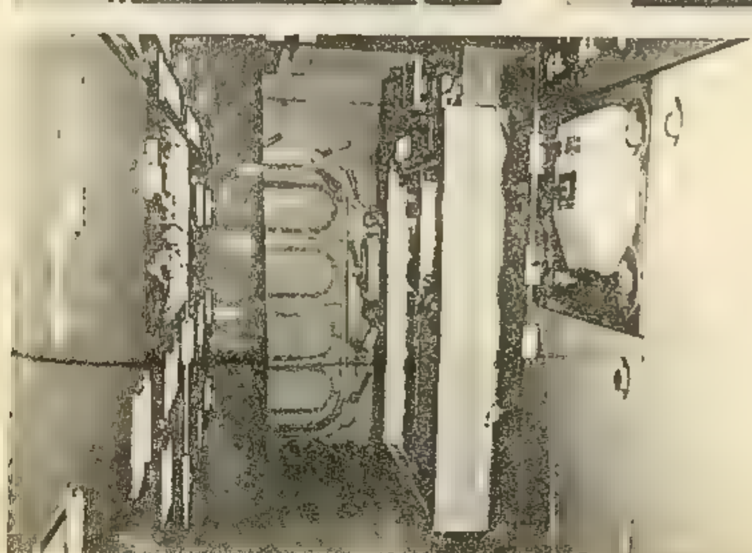
a) All-weather performance against sm supersonic missile targets.
b) Very short reaction time and fully automatic engagement sequence.
c) Short minimum range and coverage to high angles of sight.
d) Missile to be handled easily by two men and short enough to be stowed vertically between decks.

The system is also required to be effective against aircraft targets and to be capable of engaging surface targets

As early as 1962 the development of stand-off weapons such as the air-to-surface Martel and the wide range of Soviet air-to-ship missiles made it clear that in future anti-ship missiles could be very small, very fast and arrive from anywhere between sea level and very high angles of sight. These missiles would also have a much higher kill probability than existing weapons. The sinking of the Israeli destroyer 'Eilat' by Styx missiles during the 1967 Arab-Israeli war brought home to the navies of the world the importance of the missile threat. This impression was reinforced by further success of Styx-firing fast Patrol Boats during the Indo-Pakistan conflict.

Left: *The anti-ship missile threat.*
Above: *HMS Broadsword*

SECRETO



The GWS 25 ship's installation is completely autonomous,fully automatic and divides into the 3 major sub-systems of surveillance radar, tracking radar and missile launcher Each major sub-system is largely self-contained, and incorporates its own dedicated data processing system. Sub-systems can be fitted to provide single or multiple tracker/launcher configurations, in accordance with the degree of capability required to handle the anticipated threat

If the surveillance system is to achieve the necessary ultra-rapid evaluation of the threat, priority must be given to accurate determination of vital target range, bearing and velocity information. For this reason, and to optimise performance against the small fast missile in a severe background clutter environment, pulse doppler techniques have been exploited.

Two high power radars operating in different bands are used to satisfy the requirements for detection of surface and air targets; the surveillance complex combines a conventional 'S band radar – Type 968 – with a special self-adaptive 'L' band pulse doppler radar – Type 967. The two antennae are mounted back-to-back on a roll and pitch stabilised masthead platform, and give complete cover from low level to very high angles of sight. The IFF – Identification Friend or Foe aerial is also included with this antennae system, and the complex rotates at a speed of 30 r.p.m., giving a two-second data renewal rate for the data handling system.

The Type 968, a conventional pulse radar, is used for surface warning and for low air or surface target allocation. The Type 967 has as its prime objective the vital automatic detection of small hostile missiles anywhere between the surface and high angles of elevation, and in severe coincidental radar clutter. Together with information obtained from the IFF system, complete target data is furnished, via signal processing and plot extraction, to the dedicated data handling system based on the Ferranti FM 1600B computer. This complex carries out the major functions of track forming, threat analysis, establishment of threat priorities and subsequent allocation of targets to trackers. The information gained on target range, bearing and velocity is extremely accurate, sufficiently so to simplify the acquisition scan patterns used by the tracking radar

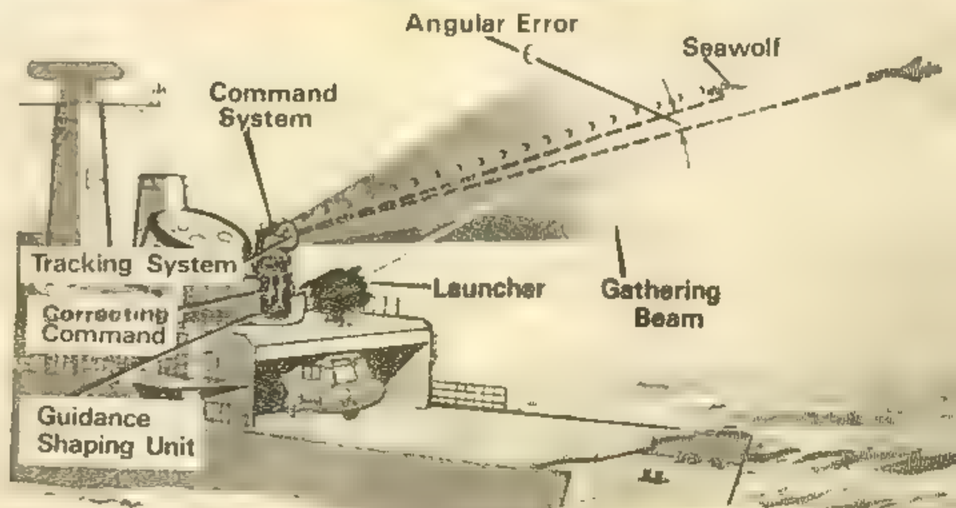
Thus, constant total-envelope surveillance is ensured, and the accuracy of data fed to the tracker system is optimised to guarantee that acquisition of the target will be achieved with minimum system reaction time and regardless of sea state.

Tracking

The tracking technique employed in the GWS 25 system is a direct result of the missile and guidance philosophy which resulted from the Royal Naval specification for a small, light missile capable of being treated as a round of ammunition, stored vertically between decks, and free of the need for on-board testing. To obtain the desired missile parameters, simplicity of missile electronics was achieved by the adoption of a Command to Line-of-Sight guidance concept, eliminating the need for the missile to carry either homing head or guidance computer. The tracking radar therefore carries an additional burden and must provide remarkable tracking accuracy in respect of the hostile target, and a guidance capability in respect of the simultaneous control of two SEAWOLF missiles.

The Type 910 Tracking Radar is therefore a differential tracker, and also exploits the pulse doppler concept to achieve the same level of clutter suppression as the Type 967 surveillance element. Using mono-pulse techniques, this radar gives the GWS 25 system an all-weather performance against the smallest attacking missile in the most exacting radar clutter conditions.

Electronic Angle Tracking is the major feature of the command/guidance loop, and is the means whereby the



Above: *Tracking Radar*
Left: *Command to line-of-sight guidance*

target and missile sightlines are compared differentially and the resulting angular difference and rate of turn used in the guidance shaping unit to generate commands to bring the missile back to the sightline. In respect of small angles this is achieved without physically moving the mount; this contributes to the smoothness and accuracy of the track. The missile command transmitter and antennae are carried on the tracker mount alongside the main tracking radar antenna

High quality servos provide precise control of the stabilised tracker, and ensure rapid acquisition of the target in response to the accurate positional data received from the surveillance system After launch the missile is immediately acquired by the wide angle gathering beam of the tracking radar, and automatically and quickly gathered onto the established target sightline, giving SEAWOLF its excellent minimum range performance. Thereafter, target and missile are tracked together using the same antenna and receiving system in a time multiplexed mode with the electronic angle tracking feature. Depending upon whether only one, or a salvo of two missiles are fired, there may be up to three separate channels of electronic angle tracking in operation simultaneously.

Television Systems

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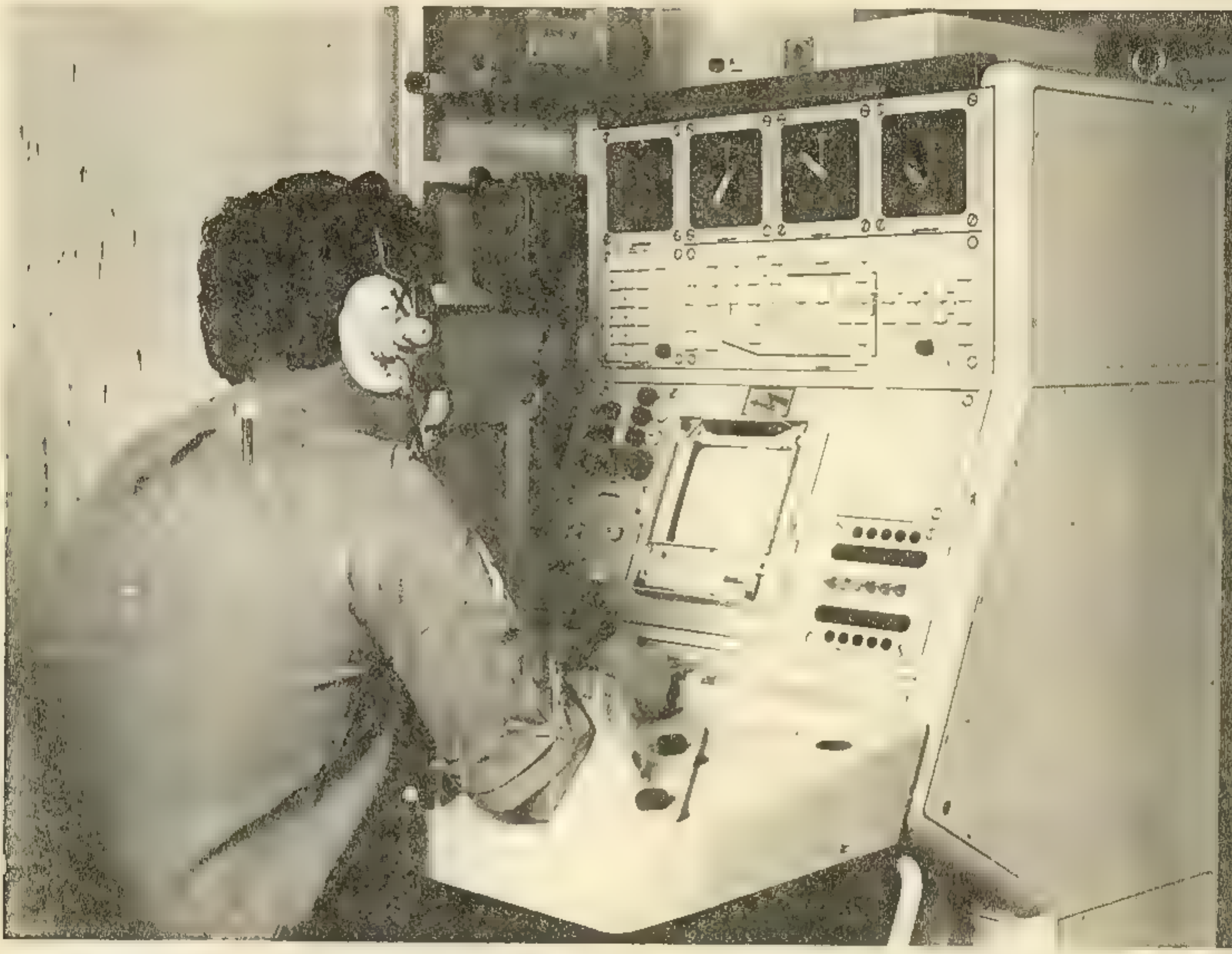

Tracking System

The GWS 25 answer to the low level target tracking problem is to mount a television system on the radar tracker and accurately align the camera to the radar bore sight. Target acquisition is normally carried out using the radar tracker and control then passed to television. The television equipment includes split optics to provide separate tracking channels for target and own missiles and the method of operation is analogous to the radar mode. Wide and narrow beams are available to meet gathering and guidance requirements and mirror servos operating within the optics provide the equivalent of the electronic angle tracking function when the tracker is under television control

After a normal acquisition sequence a television engagement takes place if the target is at very low level and the quality of radar tracking is degraded in elevation due to multi-path effects

The operator maintains the target on the monitor cross wires and the same sequence for missile firing is followed as when using radar.

After launch as the missile flare enters the wide angle field of view used during the gather phase it is acquired automatically by the television tracker It is then automatically tracked using the narrow angle field of view by a gate which is maintained about the flare image. Manual tracking of the target and auto-tracking of the flare continue until the end of the engagement.

Aimer Trainer and Performance Assessment

A Television Operator Training Console forms part of each GWS 25 system ship fit, and provides both training and performance assessment for the television system operator at the Missile Control Console

The Type 910 tracker mount servo response, missile manoeuvre and target manoeuvre simulation functions

re generated in the Training Console. Other factors such as reduced visibility, glare, spray and ship motion can be introduced into the simulation n practice a typical engagement sequence would be set up by the nstructor at the Training Console This would include any one of a number of preset target manoeuvres, ranging rom sea-skimming to high angle diving or climbing. The operator then proceeds through the necessary drills and procedures to track the target using the joystick controller at the Missile Control Console. The tracking performance is defined as the percentage of time on target and whether a hit or miss is achieved at range coincidence. During the engagement the operator's observance of the drill sequences and his reaction to the introduction of external factors is monitored by the instructor. A video tape recorder forms part of the Training Console. In addition to providing operational data logging for the GWS 25 system it also provides the facility for playing pre-recorded video tapes of typical television engagements. From these the operator's skill, both in detecting distant targets and in estimating the correct time to manually initiate the firing sequence, are assessed.

As the simulated engagement is displayed simultaneously at both the Missile Control Console and the Operator Training Console, this latter Unit may be situated in a compartment other than the Operations Room. The system is also employed as a shore-based aimer trainer

Launcher and Firing System

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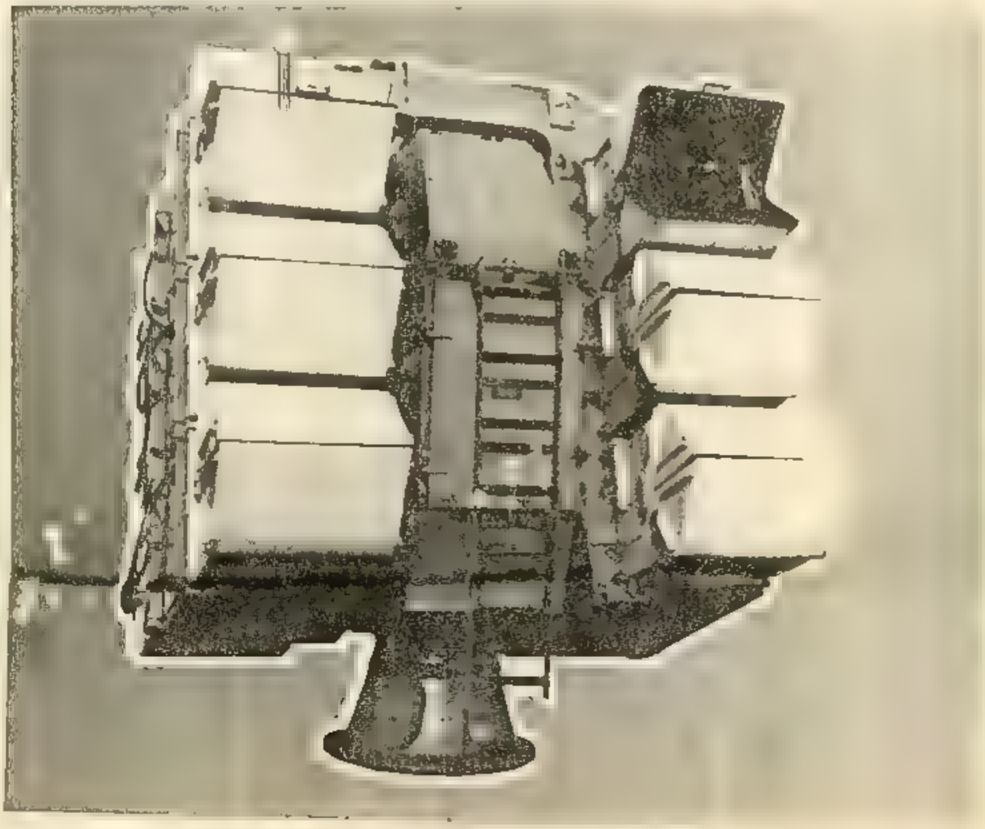
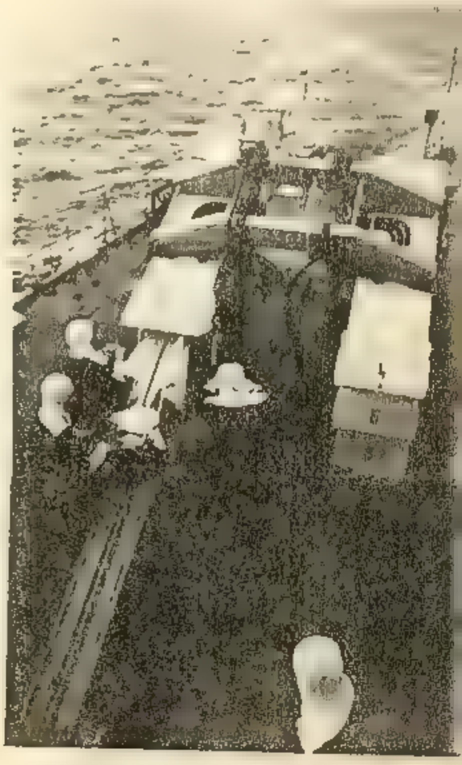
The Seawolf Launcher and its associated control equipment form the Launching and Firing System, which, during an engagement, is automatically controlled to point and fire Seawolf missiles. The quick reaction Launcher comprises 6 rectangular box shaped barrels, each with its own rail system, doors and door operating gear. The protection against the environment afforded to the missiles enables them to remain in the launcher for long periods. The barrel arrangement forms part of a rotating structure that trains about a fixed pedestal and elevates on trunnion arms. Reloading of missiles is carried out manually with the help of a mechanical aid which attaches to the rear end of the barrel and permits a smooth feed of the new missile onto the rail system.
Control cabinets are located in the Launcher Control Room, which is unmanned during an engagement and contains local controls for maintenance, testing and clear barrel operations. Launcher training and elevation pointing motions are controlled by a direct armature drive servo system using coarse only synchro signals, similar to the one proven with the successful Sea Dart System.
Missile firing equipment employs digital techniques to automatically select and fire missiles, the controlling element being the Missile Firing Unit (MFU) which is housed in the Launcher and Firing Control Cabinet. The MFU assesses the availability of missiles with respect to the clear arc firing zone and target angle of sight and, upon demand, initiates a precisely timed sequence of firing pulses to a selected missile. The interceptor switch, which is the main firing safety switch, is also accommodated in the MFU





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The need to keep missile cost and size to the minimum led to the choice of Command to line-of-Sight as the guidance mode for the Seawolf missile. With this guidance method most of the guidance calculations are carried out in the ship-borne equipment, thus simplifying the missile design.

The Seawolf missile is of conventional cartesian configuration. There are four fixed wings and four rear-mounted control surfaces.

The detachable forebody contains the fuze, safety and arming unit and warhead. A combined proximity and contact fuze is fitted and the warhead is of the blast fragmenting type.

The guidance pack, comprising the gyros, batteries, command link receiver and auto-pilot electronics, is situated between the warhead and the motor. The command link aerials are fitted on the wing tips.

The motor case forms the central part of the missile body, and exhaust gases pass through a blast pipe to the venturi fitted in the tail of the missile. The missile is of the 'dart' type, that is to say that the motor burns for a short period to boost the missile up to a speed in excess of Mach 2, after which it coasts.

The missile afterbody contains the motor blast pipe and nozzle and the hot gas actuators for the control surfaces. Flares, which enable the missile to be tracked automatically in the Television mode, are fitted in the tail cone.

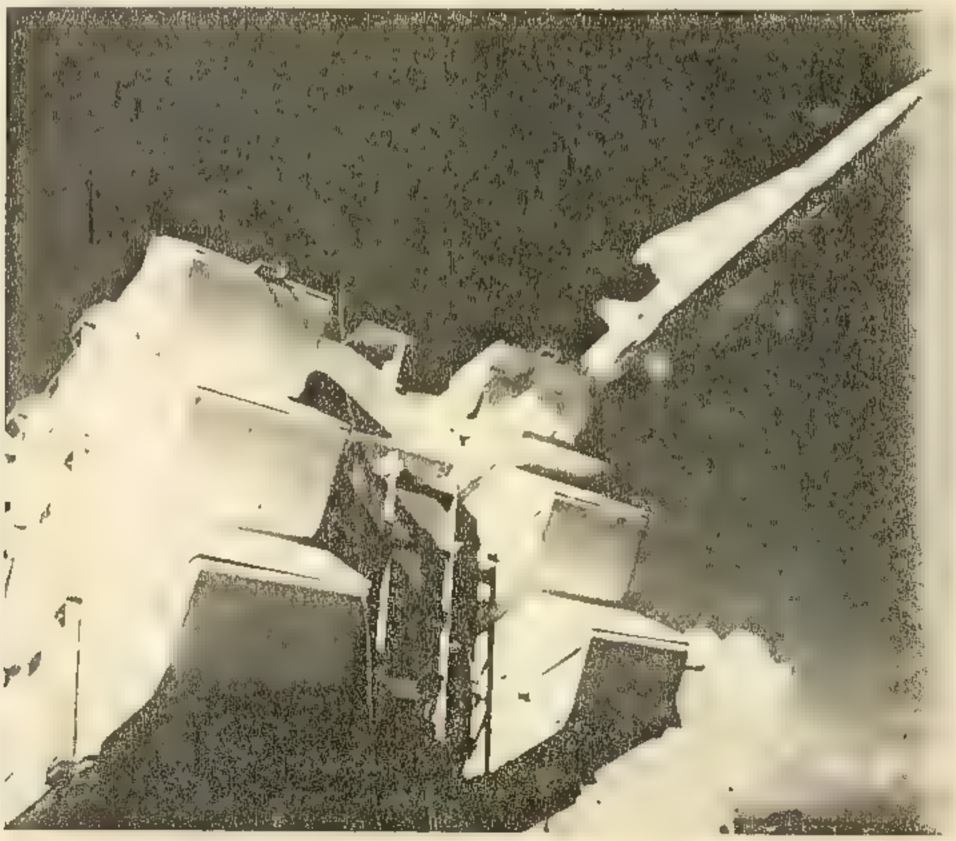
The approximate dimensions and weight of the missile are:

Length 2.0 m
Span 0.7 m
Weight 80 kg

Guidance Shaping Unit

This unit consists essentially of a computer which is used to calculate the commands necessary to bring the missile back on to the sight-line. The unit receives inputs of missile-to-sightline misalignment from the electronic angle tracking circuits of the 910 radar or from the television system and uses these, together with inputs of target angular rates, to generate coded command signals which are transmitted to the missile over the microwave command link.

Left: *Seawolf missile*
Below: *Seawolf launch from HMS Penelope*



Engagement Sequence

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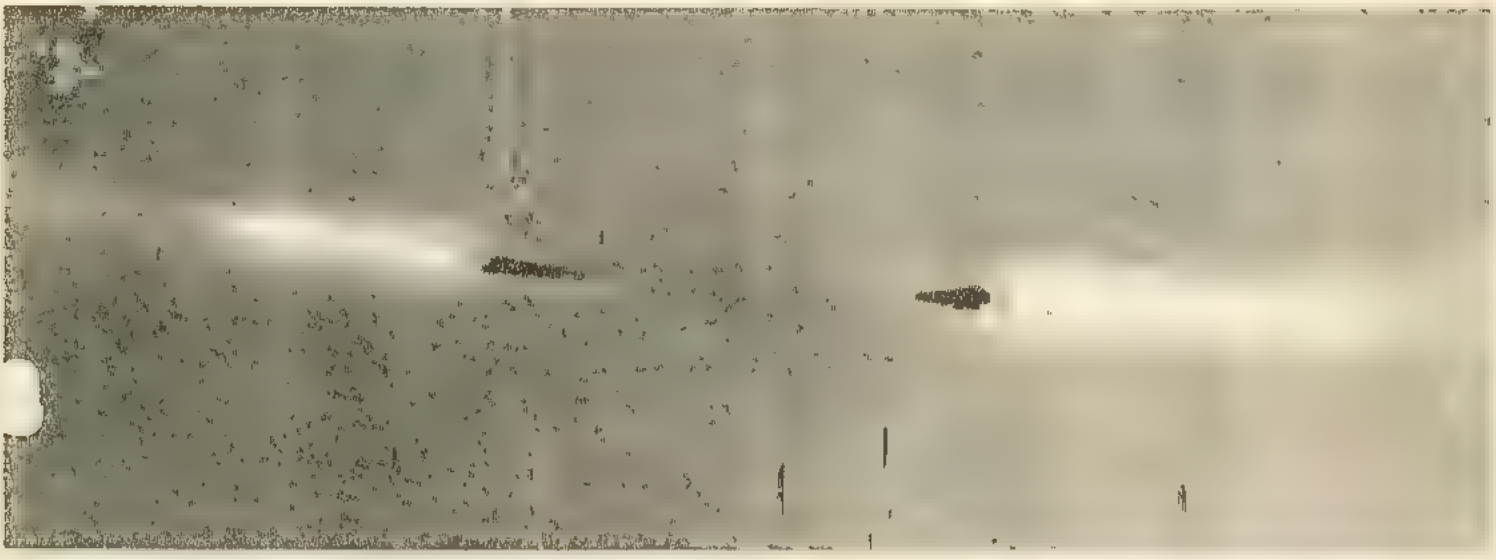

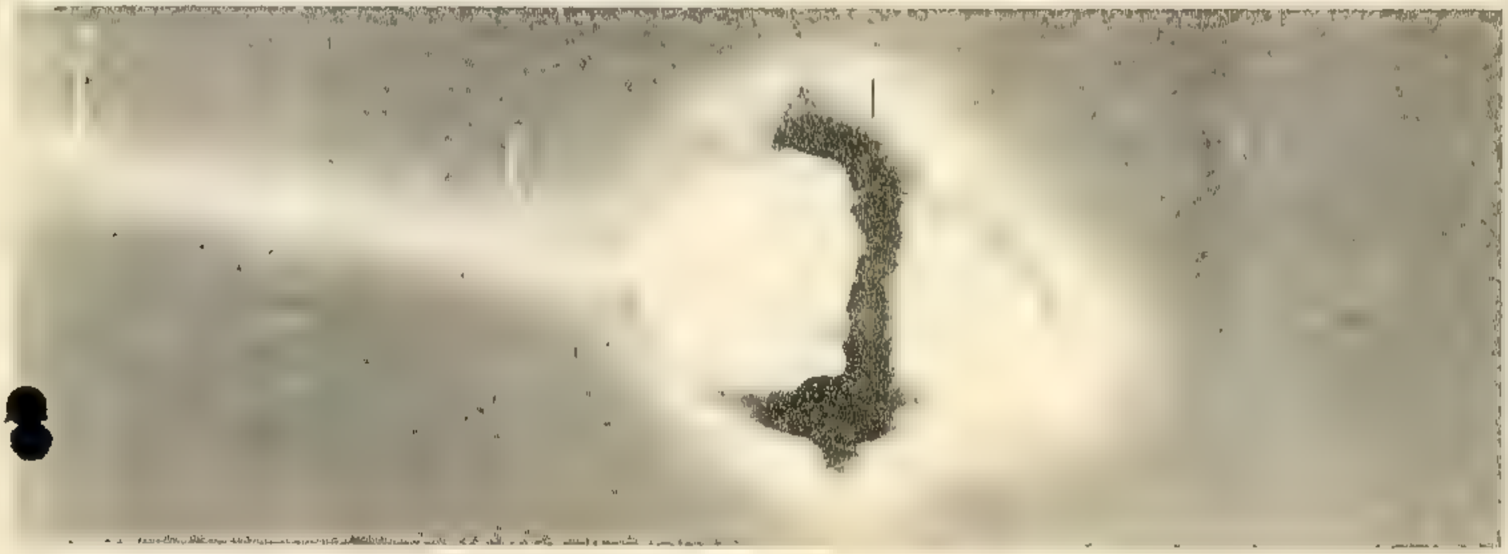

Detection and threat evaluation

A typical engagement sequence for the GWS 25/Seawolf system starts with the detection of an incoming missile target by the Type 967 L-Band pulse doppler radar. Target bearing, range and velocity are automatically extracted and fed into the surveillance data-handling computer. A small number of consecutive detections is sufficient to enable the computer to form an unambiguous track on the target. Automatic threat evaluation are then carried out. The IFF system first identifies targets which are potentially hostile and then the computer compares the characteristics of the tracks with a stored table of criteria for threat assessment. If the comparison process results in a track being designated as an immediate threat the appropriate tracker/launcher combination will be selected to engage it. All the above operations take place automatically within only 5 to 6 seconds of initial target detection.

Target acquisition

Once a tracker and launcher have been selected to engage a particular target, target data is passed to the tracker to enable the latter to commence its search pattern. The tracker, under the control of the tracker computer, slews to the indicated bearing and then commences a search in elevation. Since the surveillance radar is capable of providing very accurate target indication data, the tracker search time is correspondingly small. The tracker computer also calculates the launcher aim-off necessary to ensure that when fired the Seawolf

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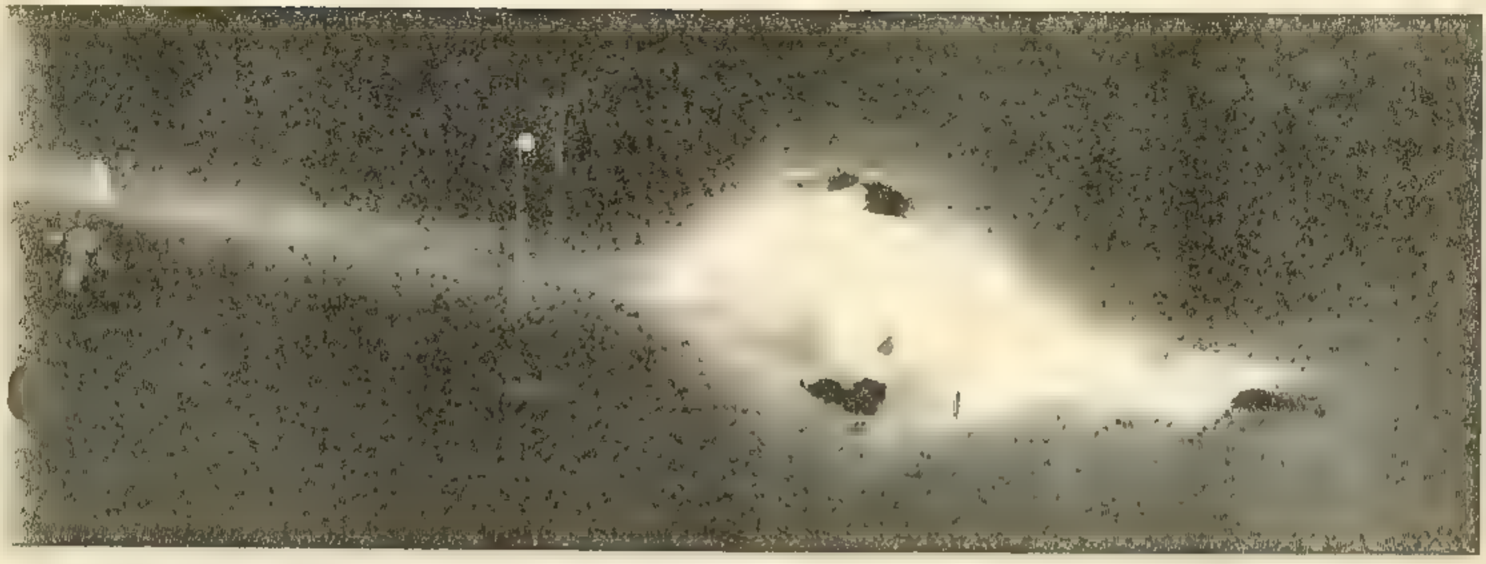

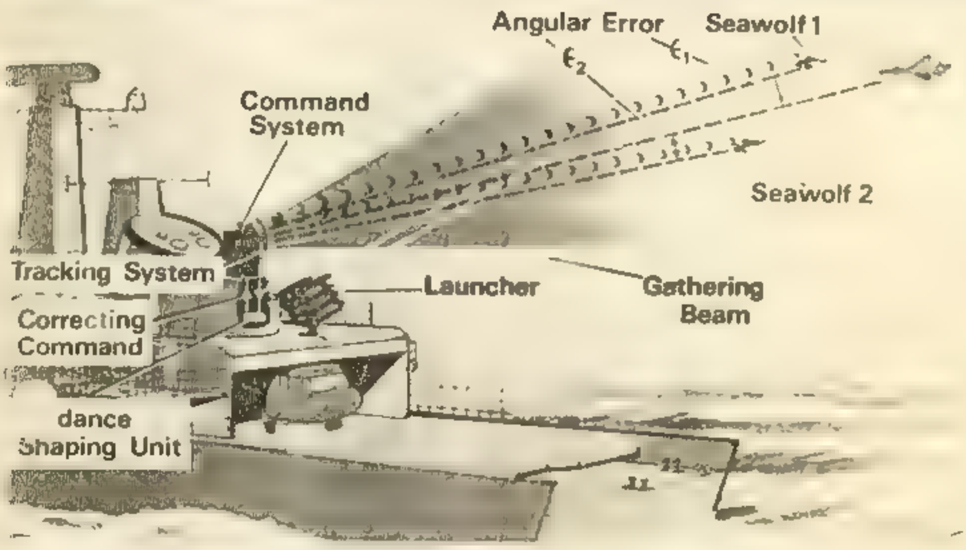

missile enters the gathering beam. The entire operation is automatic under control of the tracker computer.
Once the Type 910 tracker has detected the target it 'locks-on' for bearing, elevation, range and velocity and commences to track the target.

Radar engagement

Radar tracking will be used for both the target and the missile, unless the target is at low level and the quality of radar tracking is degraded in elevation, in which case the system will automatically switch to the television mode. The computer will automatically fire the first Seawolf missile so that interception will take place at maximum missile range. If salvo firing has been selected, a second Seawolf missile will be fired a few seconds after the first. Both missiles will be tracked separately by the radar tracker, and the appropriate missile-to-target misalignments (derived by the electronic angle tracking system) will be used to generate commands to steer the missiles back to the line of sight.

Television engagement

If, due to the low height of the target or other causes, a television engagement is selected, the sequence of events is similar to that described above, but with target and missile tracking being done by television. The operator at the Missile Control Console observes the target on a television screen and uses a pressure-type joystick to maintain the crosswires on the target. The missile is gathered and guided optically using the television system, in a similar way to the radar engagement.

System Capability

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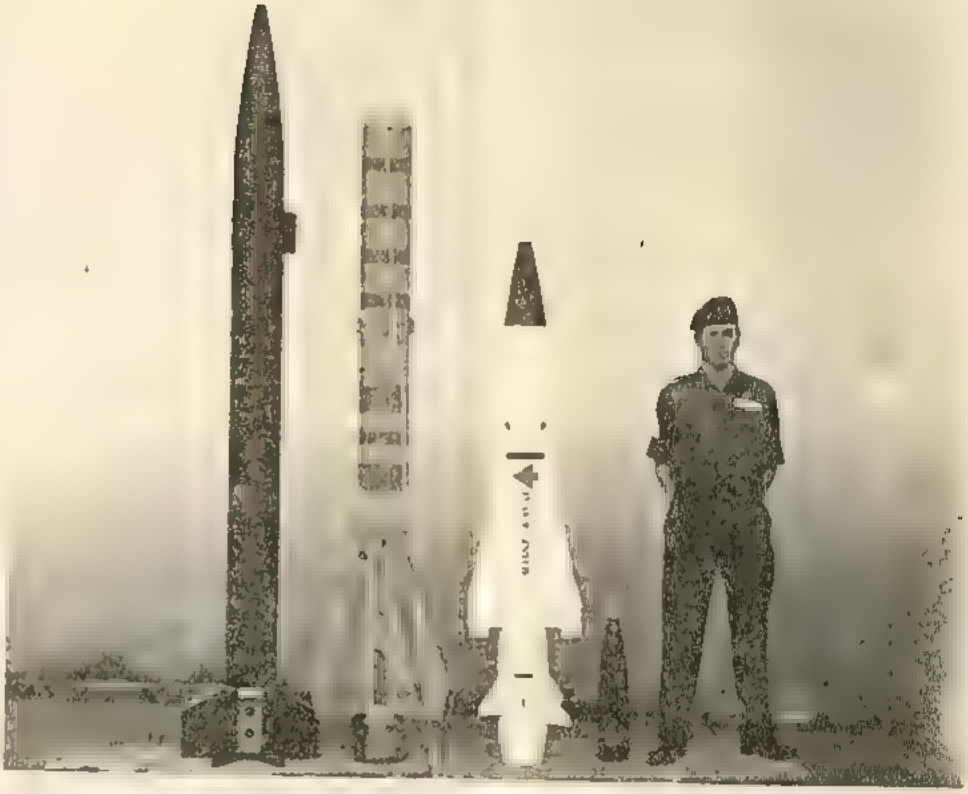
The GWS 25/Seawolf system is effective against a very wide range of targets, extending from very small very fast (in excess of Mach 2) missile targets to ships and surface effect craft
Whilst the principal threat to warships in the 1980's will come from anti-ship missiles, the manned aircraft threat will continue to exist. High priority was given to this threat during the development of the GWS 25/Seawolf system, and the system is fully effective against all aircraft targets coming within range, including Remotely Piloted Vehicles (RPV's).
A particular feature of GWS 25/Seawolf is its excellent performance under clutter conditions. The full capabilities of the pulse doppler technique have been exploited in the system's radars, with the result that its performance against small missile targets remains unimpaired even in the presence of heavy sea and land clutter. The techniques used for clutter suppression also give the system considerable resistance to ECM
Another important characteristic of the system is its completely automatic operation. This is essential if the system's capability of engaging very fast missile targets is to have any practical value. Target detection, track initiation, track formation, threat evaluation and weapon allocation are all entirely automatic, as are the processes of target indication, target acquisition and engagement. Manual intervention is not required under normal circumstances, the appropriate Weapon Direction and Control personnel merely monitoring the progress of the engagement.
Particular attention has been paid to reliability and ease of maintenance in the design of GWS 25/Seawolf. The system has a high Mean Time Between Failures (MTBF) and thanks to a built-in automatic test facility, fault diagnosis is rapid and effective. Repair is by replacement of sub-units or units at printed board level, and the Mean Time to Repair (MTTR) is 10 minutes. During daily checks the system remains at 1 second's notice and during the fortnightly checks full readiness is achieved within one hour.
The Seawolf missile is capable of being left in the launcher for long periods at sea, and whilst embarked no maintenance or testing is required
The performance of GWS 25/Seawolf has been proven in the course of extensive firing trials at Woomera in Australia, at Aberporth in the United Kingdom and on board the trials ship HMS Penelope. Targets used include Mach 2 Petrel rockets, 4.5 inch shell Jindivik drone aircraft and Rushton towed targets
A successful low-level firing programme was carried out in 1975/76 to prove the system's capability against sea-skimming missiles.
To date over 70 guided rounds have been fired with over 85% of the engagements being successful. The high number of targets actually hit and destroyed by telemetry rounds without warheads has in fact caused problems of target supply.
These very successful results, which are being fully confirmed under sea-going conditions on board the trials ship HMS Penelope, demonstrate that the production systems when installed in ships of the Royal Navy will have an unrivalled capability against the missile threat of the 1980's.



Above: Seawolf with representative missile targets – from left to right – Petrel, Rushton, Seawolf, 4.5in shell

System Variants

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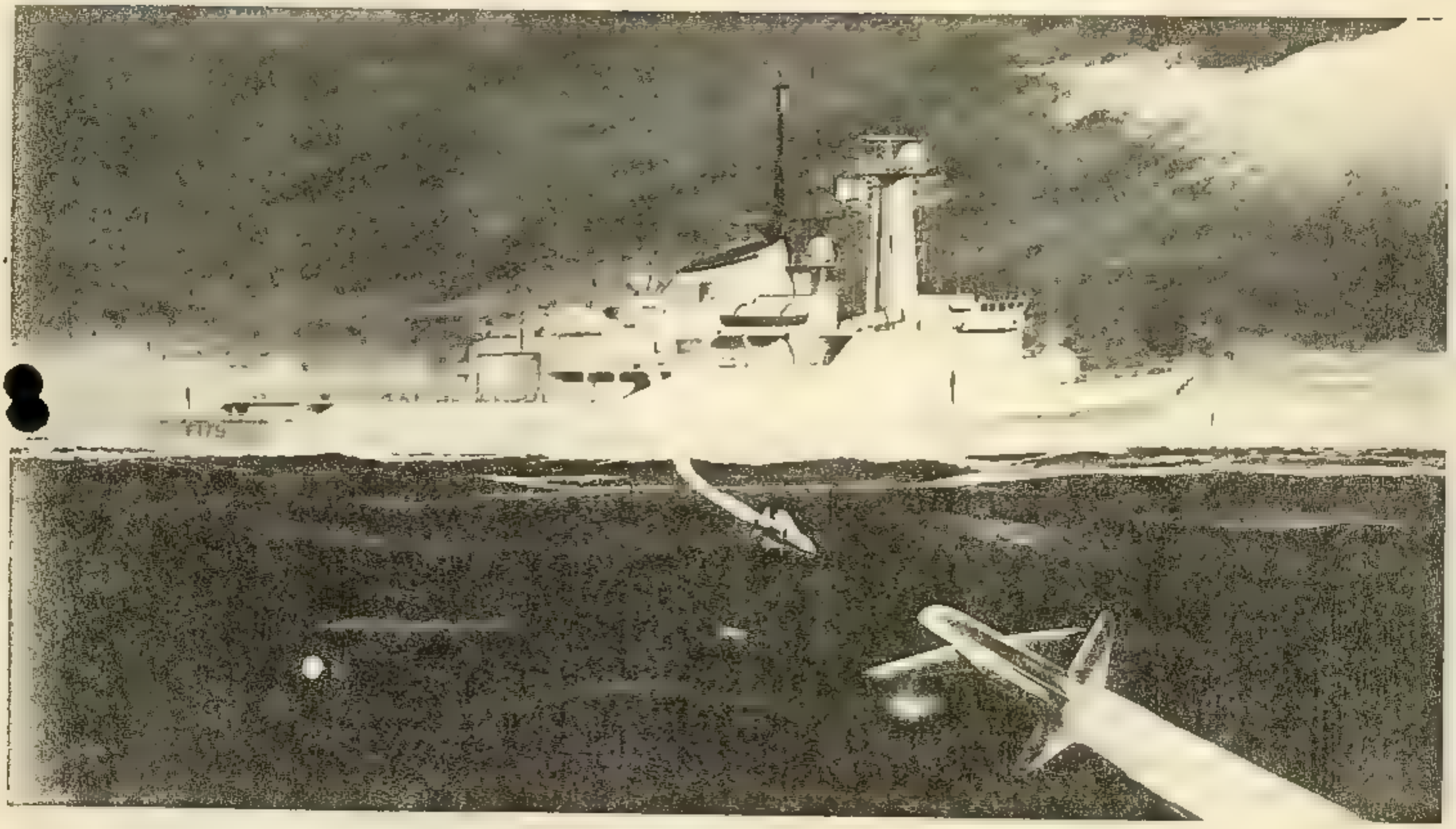

GWS 25/Seawolf has exceptional performance against a very wide range of targets, from the largest down to the equivalent of a 4.5 inch shell and under a very wide range of conditions. However, this has resulted in a system which due to its size, weight and power consumption requires to be fitted in ships of a certain minimum size.

It has been recognised that there is a need for a missile system to provide an adequate anti-missile and anti-aircraft self-defence for ships which because of their smaller size cannot take the full GWS 25/Seawolf system.

To meet this need, the Seawolf PSI family of systems is available. In a Seawolf PSI system, the GWS 25 tracker, launcher, missile and guidance loop are retained unchanged, with the same performance as when fitted in the full system. However, instead of using the dedicated Type 967 surveillance radar and its associated computer, use is made of the ship's existing surveillance radars, common-user operational data-handling equipment and displays. This results in a system having considerable weight and cost advantages over the full GWS 25 system, and having a performance which more than adequately covers a wide range of targets and conditions.

In a Seawolf PSI system, the method of operation is identical to GWS 25 from the moment that the target is acquired. The principal difference lies in the Threat Evaluation and Weapon Allocation processes, where a semi-automatic instead of a full automatic procedure is used

Several versions of the Seawolf PSI family of systems have already been studied, with different combinations of currently available surveillance radars and operational data-handling and display equipments. It has been shown that the system can be fitted in ships as small as 2000 tons.

Seawolf PSI is the ideal solution of th anti-missile defence problem for navies whose ships although limited in size still have to face the anti-ship missile threat of the 1980's.

SECRETO

Marconi Radar Systems

Marconi Radar Systems Limited, a GEC-Marconi Electronics Company, incorporates the Company that designed and manufactured the World's first operational radar Based at Chelmsford in Essex, and with Research and Manufacturing establishments at several other locations throughout the United Kingdom, the Company is Europe's largest supplier of radar systems Its productions, which range from civil air traffic control radars to complete ground-based and shipborne defence radar systems, have been installed in over half the countries in the World. The Company benefits from its close association with other GEC-Marconi Electronics companies specialising in avionics, television, electro-optical systems, specialised components and telecommunications. It draws on central resources which include the Marconi Research Laboratories, the Software Centre, and Marconi College. It is represented worldwide through a network of local agents, many of whom are themselves within the GEC group of companies.

Vickers Armament Division

The Vickers Shipbuilding Group, of which the Armament Division forms part, is situated at Barrow-In-Furness, Cumbria, in the North West corner of England. Over the years the Division has been responsible for the design, development and manufacture of many Gun Systems, which have seen service with numerous Armies and Navies throughout the world. For more than a decade its expertise has been utilised in the production of Missile Launchers and associated Handling Gear for sophisticated weapon systems such as Seawolf, Sea Dart, IKARA and CORVUS. Production of these equipments is currently going ahead for the U.K. and overseas customers. Vicker's name has been synonymous with armament production throughout a period covering two world wars and the intervening years, and the Company continues to make an important contribution to present day and future defence requirements.

British Aircraft Corporation (Guided Weapons)
a British Aerospace Company

The Headquarters of the Organisation, which came into being in 1963, are situated at Stevenage, about 30 miles north of London. The total number of employees is 10,000, of whom 3,500 work in a second factory at Bristol. BAC (GW) specialises in tactical systems for anti-aircraft, anti-tank and warship defence. The Rapier ultra low-level air defence system and the Swingfire long-range anti-tank guided weapon are in quantity production for the UK and overseas customers The Seawolf naval anti-missile/anti-aircraft system and the Sea Skua helicopter launched anti-ship missile are entering the production phase Through its guided weapon programmes, BAC(GW) has also built up considerable expertise in associated technologies, such as microwave radomes, high performance gyroscopes and gyro-stabilised equipments

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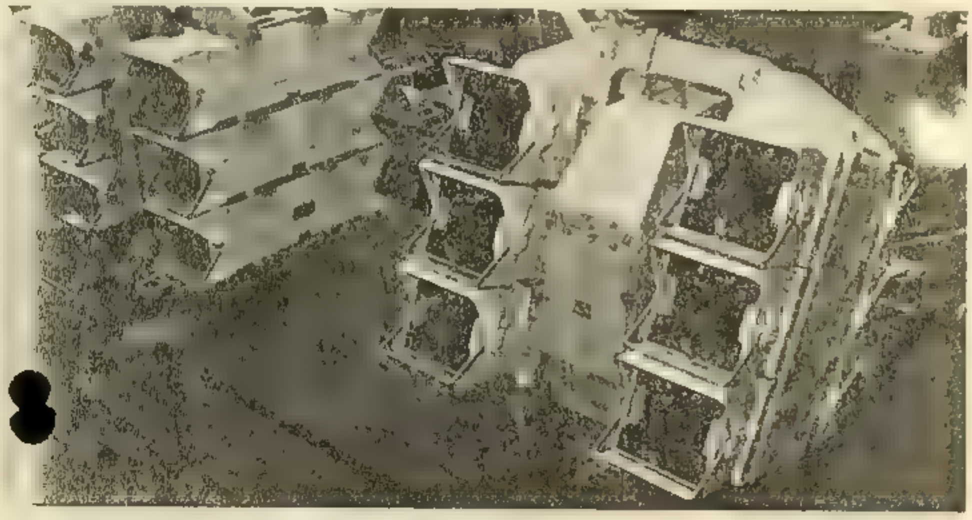

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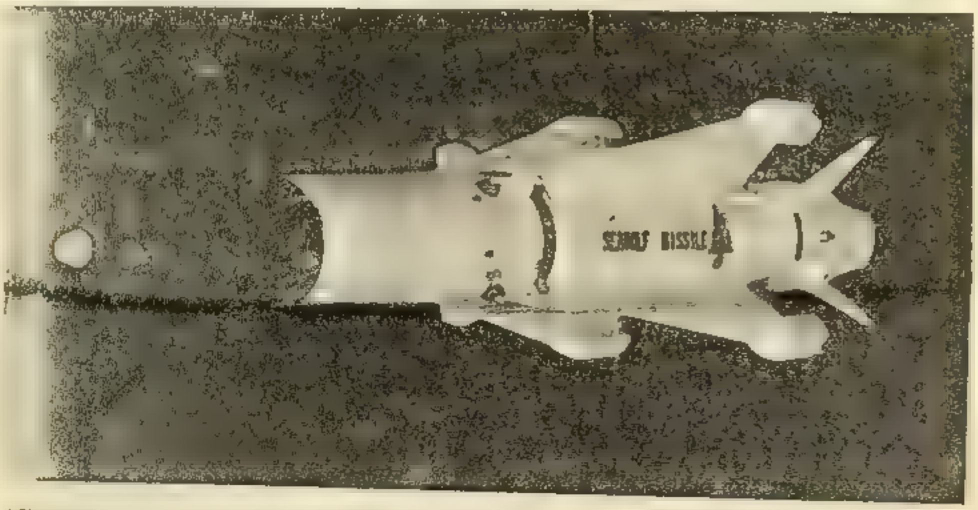

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FOJA 65

AERONAVES

CANT.	NOMBRE	CARÁCTER	CINEMÁTICA	CAPACIDAD OPERACIÓN	ARMAMENTO	OBSERV.
23	NIMROD	EXPLORACIÓN – GUERRA ELECTRONICA.–	AUTONOMIA 12 Hs – RADIO ACCIÓN: 2700 MN – Vd: 425 ND.– Vd MAX: 475 ND.– TECHO MÁX 42000 PIES –	PISTA 1600 M	COHETES: SNEB – MISIL SIDEWINDER AMET: ADEN 30mm BOMBAS: 453 KG TORP (BUSCADOR) MK 44.–	
16	SEA HARRIER II	INTERCEPTOR ATAQUE	R ACCIÓN 400 MN. R ACCIÓN 250 MN (STOL) – Vd MAX 600 ND – TECHO MÁX: 50000 PIES (15200 M).– LAS CAPACIDADES SE REDUCEN 60% OPERANDO EN VSTOL –	T. T. B (Todo Tipo Buque) –	LANZACOHETES 68 MM – BOMBAS 453 KG TORPEDOS (BUSC) AMETR. 30 MM – MISIL SIDEWINDER	
12	SEA KING	ANTISUBMARINO EXPLORACIÓN	R ACCIÓN: 330 MN (SIN RESERVA)	T. T. B.	TORP: 4 MK 44 MISILES: KORMORAN MMB –	RADAR DOPLER 580.– RADAR AW 391 – SONAR Y RADAR –
12	SEA LINK	GUIADOR DE MISILES – –	R ACCIÓN: 156 ML (SIN RESERVAS)	T. T. B.	TORP 2 MK 44 MISILES. AS12 AMETR.: 20 MM COHETES: 7 DE 2"	PUEDE TRANSPORTAR 10 HOMBRES –
7	WASP	PROPOSITOS GENERALES – AKS.–	R ACCIÓN: 270 ML	T. T. B.		
25	WESSEX	TRANSPORTE DE TROPAS.–	R ACCIÓN: 120 MN CON 28 HOMBRES	T. T. B.		SIMILARES CARACTERISTICAS DEL SEA KING COMANDO –

JEFATURA DE INTELIGENCIA DEL EMGA
HOJA 66

CANTID.	NOMBRE	FUNCION	MOVILIDAD	CAPACIDAD TRANSPORTE	ARMAMENTO						SENSORES	COMBUSTIBLE RADIO ACCION
1	INTREPID (NO ZARPO) FEAR LESS	ASALTO ESLORA 152,4m	Vd 21nd ALCANCE 5000 (ZONA) CAPACID 11000	EQ COMPLETO 380/400h 700 (EQ LIVIANO)	4x4 SEACAT 2x40 mm						BUSQUEDA A.RE/SUPERFICIE 993 NAVEGACION 976	5000 Ms 20 Nd
1	ENGLADINE	APOYO DE HELICOPTEROS	1967 DESPLAZ 9000tn TRIP: RFA 161	4 WESSEX 2 SEA KING 2 WASP 63h.								5000 Ms 20 Nd
1/2	SIR LANCELOT	LOGISTICO ESLORA: 120m.	Vd: 17 nd. DESPLAZ. 3270tn. TRIP: 68h/136h	20 HELICOPT 340 h.								815 tn 8000 Ms a 15 Nd
2 x 2/3	OLMEDA PLUMLEAP GREY ROVER TIDE SPRING APPLE LEAF	PETROLEROS (FLOTA)	DESPLAZ 9000tn									30 000 tn
1 2	FORT GRANGE	REABASTECIMIEN	Vd: 22 Nd DESP 23 600 tn ANTIG. 9 años	288 h 3500 GRANEL 10.000 COMBU SEA KING								10 000 Ms 20 Nd
	PORTAAVIONES DE ATAQUE											
1	INVINCIBLE	PORTAAVIONES ESLORA 208m	Vd. 28 Nd DESP. 19500 tn ANTIG	8 SEA HARRIERS 5/6 SEA KING A/S 900h	22 x SAM SEA DART						BUSQUEDA AIRE 992 CT 2x909 SONAR 2016 NAVEG 1006	5000 Ms 28 Nd Y CRUCERO 18 Nd
1	HERMES	PORTAAVIONES ANTISUBMARINO COMANDO	Vd: 28 Nd DESP. 23200 tn ANTIG. 22 años	7/8 SEA HARRIERS 5/6 SEA KING. 1350h	2x4 LANZADORES SEA CAT						BUSQUEDA AIRE LEJ 965 CT 2xGWS 22 SONAR 184M BUSQ. 993 NAVEG 1006	420 tn
	DESTRUCTORES											
2	ANTRIM GLAMORGAN	DD "COONTY" (GEMELO NORFOLK)	Vd. 30 Nd DESP. 6400 tn ANTIG. 12 años	2 WESSEX 471 h. c/u	4x SSM EXOCET 365 SEASLUG 2x4 LANZ SEA CAT 2x4.5"						BUSQUEDA AIRE 965 CT2xGWS 22 SEACAT SON 184 M TACTICO 992 MRS – (ARTILL) NAVEG. 978 - 901 (SEA SLUG)	784 tn.
5	SHEFFIELD COVENTRY GLASGOW CARDIF-EXETER BIRMINGHAM	DD" TIPO 42"	Vd 29 Nd DESP 3500 tn ANTIG 4, 12 años	268 h. c/u 4 SEA LINX	SAM Y SSM 22 x SEA DART 1 x 4.5" CAÑON 2 x 20 mm						BUSQ AIRE 965 R CT 2x909 SONAR 184M TACTICO 992-9 NAVEG. 1006	4000 Ms 18 Nd
3	BROADWORD BATTLEAXE BRILLIANT	DD" TIPO 22"	Vd 30 Nd DESP 4000 tn ANTIG 6 AÑOS	223h. c/u 3 SEA LINX ASM – SEA SKUA	4x SSM EXOCET 2x6 SAM SEA WOLF 2 x 40 mm 2 x 3 torp. MK-46						BUSQ AIRE LEJ 967/8 GUERRA ELECTRONICA ABBEY HILL MAE HF. SONAR 2016 Y VDS NAVEG. 1006 CT 2x910	4500 Ms 18 Nd
	FRAGATAS											
4	PLYMOUTH RHYL YARDOUTH LOWESTOFT	FRAGATA (TIPO 12) ANTIGUAS	Vd 30 Nd DESP. 2380 TN ANTIG. 22 AÑOS	235 h c/u 4 WASP	6 SEA CAT MORTAR						BUSQ. 994 FC MR3 SONAR NAVEG 978	400 tn
3/5	DIDO ARIADNE EURIALUS GALATEA AURORA	FRAGATA "LEANDER"	Vd. 29 Nd. DESP. 3200 Tn. ALC. 4000 Ms 15 Nd	223h c/u. 3 WASP	EXOCET - 4x IKARA BROAD-SEACAT [illegible]						BUSQ. 966 CT GWS 22/MRS3 SONAR VDS TACTICO 993 NAVEG 975	460 tn
[illegible]	[illegible]	FRAGATA [illegible]	Vd. 30 Nd DESP. 2750 ANT. [illegible]	175 h c/u 1 WASP	4x SSM EXOCET, 2 SEA CAT, / 1 x 4"						BUSQ 992 CT 2GWS 24 SONAR 184 M. NAVEG 978 ORION 10X	4000 Ms, 17 Nd 1200 Ms [illegible] Nd
	SUBMARINOS											
2	SUPERB SPLENDID	NUCLEARES	Vd 28 Nd DESPL 4000 4500 ANT 5, 9 AÑOS	97 HOMBRES	TORPEDOS MK 24						SONAR TYPE 2001 - 2007 - 197 y 183	
1	ORACLE	CONVENCIONAL	Vd. 10 Nd (INMERSIÓN) DESPLAZA 1610 ANT. 12 AÑOS 2410	71 HOMBRES	24 TORPEDOS CARRIED						RADAR SEARCH I BAND	

Soviet Mi-24 Hind helicopters, this missile being designated **AS-8.** Different sources have ascribed different functions to this missile, one being that of an anti-radiation missile (similar to the American Shrike) for the suppression of ground air-defence radars. The other suggested role is as a short range ground attack missile. For the former mission a passive radar homing head is assumed to be fitted, the guidance technique employed for conventional ground attack is not known.

The designation **AS-9** is thought to apply to an anti-radiation missile arming the SU-19 Fencer attack aircraft. Estimated range is about 80-90km, and official US reports claim that this weapon is at the development stage, in which case the designation applied is **AS-X-9.** The designation **AS-X-10** has been assigned provisionally to what is thought to be a Mach 0.8 laser-guided air-to-surface missile reported as carried by MiG-27, Su-17 and Su-19 aircraft. It is estimated to be about 3m long and to have a range of about 10km, using a solid propellant rocket motor.

Several other, undesignated, new air-to-surface missiles are rumoured to be under development by the Soviet Union, and the main features attributed to three of them are as follows. The first is an approximate Soviet equivalent to the US Maverick, using electro-optical guidance with a command link, and with a probable maximum range of about 40km, another is a possible replacement for the AS-4 Kitchen with a speed of Mach 3.5 and a maximum range of up to 800km, and the last is thought to be roughly equivalent to the American ALCM (Air Launched Cruise Missile) using an air-breathing turbojet and with a maximum range of up to 1200km.

UNITED KINGDOM

1530.321

SEA SKUA HELICOPTER AIR-TO-SURFACE MISSILE

Sea Skua is an all-weather, helicopter-launched sea-skimming anti-ship guided weapon system which is in an advanced state of development for the Royal Navy. Primarily designed for fitment to the naval variant of the Westland Lynx helicopter fitted with the Ferranti Seaspray radar, it will be the Royal Navy's principal air-to-surface light strike weapon for use against a variety of targets ranging from missile-firing fast patrol boats to coastal escorts, frigates and destroyers.

The helicopter Sea Skua combination provides a cost-effective, rapid-reaction surface attack capability up to and well beyond the radar horizon of the parent ship which retains the option of remaining passive and therefore undetected. Such a combination represents a valuable complement to long range ship-to-ship missiles.

The missile is light enough to permit a four Sea Skua fit on a small helicopter. Solid propellant boost and sustainer motors are used to give the missile sufficient range to provide a good 'stand-off' capability for the helicopter with consequent protection from counter attack. To commence an engagement the helicopter would close the target to enable its radar to lock on and automatically track. While in this automatic tracking mode, the radar will illuminate the target with radio frequency energy, which when reflected, provides the source onto which the Sea Skua semi-active radar homing head locks. On release from the helicopter the missile drops for a short distance under autopilot control maintaining attitude angle stabilisation in roll, pitch and yaw before the rocket motors are ignited. The Sea Skua missile then descends in stages, under control of a radio altimeter, to one of four terminal sea-skimming heights selected by the pilot prior to missile release depending on the sea state or size of target. The missile, guided by the homing head in azimuth will fly on a proportional navigational course to hit the target. The warhead is designed to explode within the target to give high lethality. Sea Skua missiles can be fired in rapid succession if required and the helicopter is free to manoeuvre after the last missile release within the limits required to maintain target illumination.

System control equipment associated with armed release of the missiles has been designed for rapid removal and replacement, thereby reducing to a minimum any weight penalty to the helicopter when it is not required to operate in the strike role. The missile can be treated as a round of ammunition as no on-board testing is required. It is delivered in a wheeled 'pal etrolley' fitted with a shock absorbing system suitable for shipborne magazine stowage.

Official dimensions have not been released but observations yield the following provisional figures: length 2.5m, span 61cm, diameter 27cm, weight approximately 70-80kg. A high-explosive warhead weighing about 20kg is probable.

Sea Skua trials round in flight

STATUS

Sea Skua is in the final stages of development, test and evaluation, and is due to enter service with the Royal Navy from 1980 onward. The first fully guided air-launch test flight of Sea Skua took place in December 1979 at the Aberporth missile range in Wales. There had been other guided flights from ground launchers and test drops of inert rounds from helicopters.

MANUFACTURERS

British Aerospace, Dynamics Group, Stevenage, Hertfordshire, England – prime contractor.

Marconi Space and Defence Systems Ltd, Chelmsford, Essex CM1 3BN, England – homing head.

3630.321

P3T SEA EAGLE AIR-TO-SURFACE MISSILE

Artist's impression of the P3T Sea Eagle anti-ship missile

The P3T Sea Eagle missile is described by its originators as a second generation air-launched sea-skimming anti-ship missile. It is planned as a successor to the Martel in arming Buccaneer aircraft, and later the Tornado and Sea Harrier deployed by UK forces for anti-shipping missions.

Active radar guidance is used and the Sea Eagle will be powered by an air-breathing turbine engine which is expected to give the missile a range of about 100km. A new multi-role radar homing head has been developed by Marconi Space and Defence Systems Ltd specially for use against ship targets and incorporating a digital computer that provides for over-the-horizon capability against multiple targets. In addition, this fully active seeker's computer serves as the central processor for controlling pre-launch information management of the transmit and receive functions, target detection, acquisition and tracking. This enables the Sea Eagle to engage a single designated target within a convoy of other but potentially less valuable, targets. Certain ECCM functions are also under the control of the missile computer.

Flight trajectories of the Sea Eagle will also be under computer control, the computer's reprogramming facility being of value in this regard and possible flight paths will include a variety of sea-skimming modes of cruise, acquisition and terminal guidance modes. A digital inertial autopilot navigation system is employed with a radar altimeter for height data.

The turbine used to power the Sea Eagle is the French Microturbo TRI 60 turbojet which has a thrust of 3kN at 28 500 rpm. The Sea Eagle airframe will probably be very similar to that of the Martel (1022.311), and the same warhead may also be retained.

STATUS

Development.

MANUFACTURER

British Aerospace, Dynamics Group, Stevenage, Hertfordshire, England.

3900.311

ADVANCED AIRBORNE ANTI-ARMOUR WEAPON (AST 1227)

This air-to-surface weapon system is being developed to conform with a British requirement specified in AST 1227, aimed at providing a weapon capable of meeting the anti-armour requirements of the 1980s and beyond.

The Hunting Engineering advanced anti-armour weapon is an aircraft-delivered weapon system for low level attack against main battle tanks and any other armoured vehicles in groups rather than individual units. Successful attack is achieved by using the cluster principle of dispensing submunitions which have a dual capability of either detonating on target impact (direct) or acting as a mine (indirect). After release a self-contained navigation system enables the weapon to engage targets well displaced from the aircraft's track. This system also allows a stand-off release against targets at ranges beyond the direct attack capability of current unpowered weapons.

Outline drawing of the Hunting Engineering AAAW munition

terrain over which it is flying, and these are transmitted back to the missile operator in the launch aircraft, which by this time can be on its way back to base. A monitor screen in the operator's cockpit will enable him to relate the missile track to the correct calculated path, enabling him to make corrections. He may be aided in this by a projected map display. When the designated target (or a target of opportunity) is sighted by the TV camera, the operator can use the radio command link to guide the missile to the target, thus completing the attack.

The TV Camera Control Unit and the Video and Command data link system have been developed by Marconi Elliott Avionic Systems Ltd.

DEVELOPMENT

The UK and France entered into an agreement for the joint development and production of Martel in September 1964, although related studies preceded this by possibly as much as four years. The first simulated firings and mock-up launchings took place in the summer of 1964, and prototypes of both versions were completed in 1965-66. Evaluation trials have been completed for both variants.

STATUS

Production contracts were placed by the British and French governments in December 1968 and production missiles and equipment are now in service with the British and French services. The Martel system is used on the Mirage IIIE, Atlantic, and Buccaneer Mk II.

Use of both anti-radiation and TV-homing versions is apparently restricted to British Forces: the TV homing AJ 168 is not used on French aircraft.

In mid-August 1977 the UK Ministry of Defence announced an RAF requirement for a new anti-ship missile to arm Buccaneer and Tornado aircraft in the 1980s. Project definition of this new weapon, designated P3T (3630.311) is under way.

MANUFACTURERS

Prime Contractors

British Aerospace Dynamics Group, Manor Road, Hatfield, Hertfordshire AL10 9LL, England.

Matra SA, avenue Louis Breguet, 78-Velizy, France.

Marconi-Elliott Avionic Systems Ltd., Basildon, Essex, England. TV guidance system.

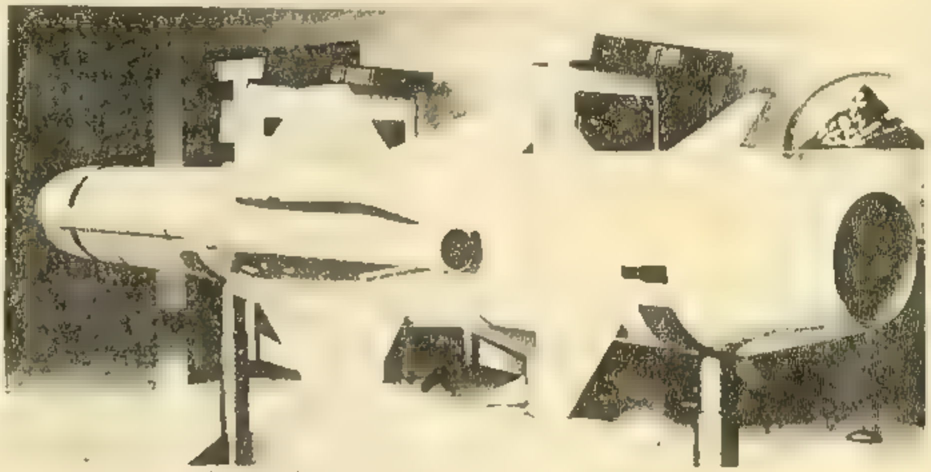
Electronique Marcel Dassault, 55 quai Carnot, 92214 Saint-Cloud, Paris, France – AD 37 homing head.

1336.321
OTOMAT ANTI-SHIP MISSILE (FRANCE/ITALY)

Otomat is the anti-surface version of an all-platforms anti-ship missile. Range is over 80km, but with fuel capacity for greater range (200km), speed is in the region of Mach 1. Inertial guidance plus a radar altimeter is used for the low-level cruise phase with active homing for terminal guidance. Two homing heads may be fitted, one manufactured by the Italian SMA company and the other by Thomson-CSF of France, thereby providing for either a sea-skimming or a climb-and-dive final trajectory. Two lateral boosters are employed for initial acceleration in the helicopter version but these are not always required for the aircraft version. A more detailed description appears in 1336.221 in the Shipborne Surface-to-Surface Weapons section of this book.

DEVELOPMENT

Studies are underway for the adaptation of Otomat to other aircraft. A series of completely guided firings has been made so far to demonstrate and evaluate the long range capability, and the shape of the final attack pattern.



Air-to-surface version of the Otomat anti-ship missile

Development continued until 1974, followed by evaluation by the Italian Navy, which has already signed a contract for the surface-to-surface version.

MANUFACTURERS

Engins Matra, 78140 Vélizy, France.

OTO Melara, La Spezia, Italy.

1771.311
HOT AIR-TO-SURFACE MISSILE

The relatively recent increase in interest regarding the use of helicopters in a specifically anti-tank role has led to the development of a helicopter installation for the HOT anti-tank weapon. The basic HOT missile is described in 2212.111 in an earlier section of this book, and the following refers to the helicopter version.

Depending upon the type of helicopter used, four, six or eight launcher ramps to accept the HOT combined container-launch-tube can be fitted, and these are elevation-slaved to the line-of-sight. For helicopter operation, a stabilised optical sighting system, APX397, is used, this being derived from the APX334 sight described in 7032.393 in the Equipment Section of this book.

The guidance system includes a triple-field infra-red 'localiser', with a 10° acquisition field, a 5° tracking field, and 1° tracking field. The function of the infra-red localiser is to establish the position of the HOT missile relative to the line-of-sight (which normally will be maintained on target by the operator using his optical sight). Appropriate guidance signals are computed and transmitted via the command wire to maintain the missile on the line of sight to the target.

HOT installation on Lynx helicopter has eight missiles

Six HOT missiles are carried in this Gazelle helicopter installation

MANUFACTURERS

Management, sales and production responsibilities rest at Euromissile, 7 rue Béranger, BP 84, 92320 Chatillon, France.

ITALY

1851.321
MARTE HELICOPTER ANTI-SHIP MISSILE SYSTEM

The purpose of the Marte system is the destruction or crippling of naval craft in all weather conditions by means of the Sea Killer missile launched from helicopters in a stand-off position.

The helicopter-borne missile used in conjunction with the Marte Project is the Sea Killer Mk 2 (20km range with 70kg warhead for the Marte version). Easily operated and light equipment only need be carried on board the helicopter since the radar performs navigation search and track of the target as well as guidance of the missile in azimuth (the missiles are autonomous in altitude by means of SISTEL-designed radar altimeter).

Installation of the Marte Weapon System has been carried out on the Agusta/Sikorsky SH 3D helicopter.

A typical installation is pictured in the nearby diagram: the SH3D helicopter shown fully equipped for

SH-3D helicopter in Marte configuration for

target. If such signals are received the homing head will lock on and the missile will operate in a passive homing mode. In the absence of signals, the radar transmitter in the missile will be switched on and a target search, lock on and tracking sequence will follow to enable the missile to intercept the target.

The RE 576 head is an autonomous automatic search and track radar, providing range, bearing and elevation data from which control signals for the missile autopilot can be derived. An inverse Cassegrain aerial system is used, with the feed passing through the centre of a ridged-plate main reflector. Energy from the feed is first directed to a semi reflector situated in front of the gimballed reflector plate, before being returned to the latter which is responsible for focusing and steering the beam. Modifications and improvements have been carried out in the course of Kormoran development by MBB and Thomson CSF.

OPERATION

Several operational modes appear possible with the guidance equipment developed for Kormoran. The major part of the trajectory is travelled under the control of the inertial system and radar altimeter followed by a terminal homing phase on to the target. The latter can be performed by active radar homing or passive homing on to radiation from the target itself. Target designation is performed by the launching aircraft's radar, although a completely blind attack seems possible if the target co-ordinates are known with sufficient accuracy. Provision is also made for optical target designation for the engagement of targets of opportunity.

A typical F-104 Kormoran sortie envisages a low level approach to a known target followed by a brief climb to above the radar horizon when the aircraft radar is turned on briefly to acquire the target. Upon acquisition the pilot transmits the relative position of the target into his autonomous navigation system and turns off the nose radar. The aircraft then manoeuvres into an appropriate attack position and when this has been reached another brief radar transmission is made to establish target position. This and other necessary initial data are then automatically inserted into the Kormoran's navigation system. On reaching a predetermined launching range the missile is released and the aircraft makes an immediate break away.

After launch the missile descends to its programmed flight level. In the first part of its flight it is under inertial guidance, aided by the radar altimeter. At a prescribed distance the inertial system of the missile homing head is activated and an active radar search pattern is initiated. After lock-on has been achieved the inertial guidance is slaved and corrected in azimuth and range by the seeker head and the missile heads for the target. At a short distance from the target the missile descends to its final flight level in order to hit the target just above the water line. This is the standard mode but others are possible.

DEVELOPMENT

Kormoran is the largest missile project so far undertaken in West Germany, and was initiated in 1964 to meet a Navy requirement. Development started in 1967/68 with MBB as prime contractor. The inertial navigation system is most probably the same as that flown in the Nord experimental AS 33 missile.

Tornado naval strike aircraft carrying four Kormoran anti-ship missiles

STATUS

The first air launch, from an F-104G, took place successfully on 19 March 1970.

So far the West German Navy is the only named user for the Kormoran, but interest from the Italian Air Force has been reported and use with the MRCA is also expected. Production has started and first deliveries began in 1977. An initial production of 350 has been reported.

MANUFACTURERS

Messerschmitt-Bölkow-Blohm GmbH, Munich-Ottobrun, West Germany. (Prime Contractor)

Société Nationale Industrielle Aérospatiale, Division des Engins Tactiques, 2 rue Béranger, 92320 Chatillon, France.

Thomson-CSF, Division des Matériels d'Avionique, 178 boulevard Gabriel Peri, 92-Malakoff, France.

Bodenseewerk Gerätetechnik GmbH, Uberlingen, West Germany. (Airborne computer, inertial navigation)

INTERNATIONAL

1022.311

MARTEL AS 37/AJ 168 AIR-TO-SURFACE MISSILE

Martel is an air-to-surface tactical missile with two alternative terminal guidance systems capable of offering a considerable stand off capability. Both versions are designed to operate in an ECM environment to which a high resistance is claimed. The forms of terminal guidance are: passive homing to electromagnetic radiation in the AS 37 anti-radar version, and visual guidance to a selected target by means of a nose-mounted TV camera and a data link over which both video and command signals are passed between aircraft and missile in the AJ 168 variant. The Martel system is the product of a joint Anglo/French development programme with prime responsibility for the AS 37 resting with Engins Matra, and for the AJ 168 with British Aerospace Dynamics Group.

General configuration of the missiles can be seen from the diagram at the beginning of this section and photographs adjacent to this entry. Length of the AJ 168 is 390cm, and of the AS 37, 420cm; body diameter and wingspan, respectively, for both versions are 40cm and 120cm. No details of performance have been revealed, but range has been officially stated both as 'several tens of miles' and 'several tens of kilometres'. This suggests a range of about 60km although maximum range will be to some extent dependent upon the height of launch and subsequent trajectory.

OPERATION

Both versions of Martel probably employ the same basic autopilot which provides guidance until either TV or radar homing systems assume control for the terminal guidance phase. There are some indications that the autopilot can be pre-programmed to provide several options of mission profile. A fundamental difference, in addition to the guidance system, is related to the two-stage propulsion assembly which is adapted to the mission requirements specific to each version.

Buccaneer armed with one anti-radiation Martel and two TV-guided Martels. Note Martel data-link/control pod on starboard inner wing station

Martel AS 37. The Electronique Marcel Dassault AD 37 homing head is believed to use a movable receiver aerial, possibly of the inverse-Cassegrain type, and this is used both prior and subsequent to launch from the aircraft. Prior to launch, the AD 37 provides data for the pilot for navigation to, and determination of, launch point. These data are presented via the aircraft equipment, and probably consist of initial warning of hostile radar signals, followed by information on their aspect relative to the aircraft. After launch the AD 37 head locks on to the radar target and generates guidance signals for the auto-pilot to direct the missiles to the target. Missile control is by means of four movable fins placed a short distance behind the cruciform wings.

Martel AJ 168. Whereas radiation by the opposing radar is necessary for the AS 37 version of Martel to operate, the TV-guided variant is designed to keep radar contact to a minimum, and for this reason it is more likely to be launched from a low altitude, preferably while the launch aircraft itself is still beyond radar range. Launch is made from a known geographical position and the weapon is directed from the launch aircraft along a calculated track to the target.

A TV camera in the nose produces pictures of the

terrain over which it is flying, and these are transmitted back to the missile operator in the launch aircraft, which by this time can be on its way back to base. A monitor screen in the operator's cockpit will enable him to relate the missile track to the correct calculated path, enabling him to make corrections. He may be aided in this by a projected map display. When the designated target (or a target of opportunity) is sighted by the TV camera, the operator can use the radio command link to guide the missile to the target, thus completing the attack.

The TV Camera Control Unit and the Video and Command data link system have been developed by Marconi Elliott Avionic Systems Ltd.

DEVELOPMENT

The UK and France entered into an agreement for the joint development and production of Martel in September 1964, although related studies preceded this by possibly as much as four years. The first simulated firings and mock-up launchings took place in the summer of 1964, and prototypes of both versions were completed in 1965 66. Evaluation trials have been completed for both variants.

STATUS

Production contracts were placed by the British and French governments in December 1968 and production missiles and equipment are now in service with the British and French services. The Martel system is used on the Mirage IIIE, Atlantic and Buccaneer Mk II.

Use of both anti-radiation and TV-homing versions is apparently restricted to British Forces; the TV homing AJ 168 is not used on French aircraft.

In mid-August 1977 the UK Ministry of Defence announced an RAF requirement for a new anti-ship missile to arm Buccaneer and Tornado aircraft in the 1980s. Project definition of this new weapon, designated P3T (**3630.311**) is under way.

MANUFACTURERS

Prime Contractors:

British Aerospace Dynamics Group, Manor Road, Hatfield, Hertfordshire AL10 9LL, England.

Matra SA, avenue Louis Breguet, 78 Velizy, France.

Marconi-Elliott Avionic Systems Ltd, Basildon, Essex, England – TV guidance system.

Electronique Marcel Dassault, 55 quai Carnot, 92214 Saint-Cloud, Paris, France – AD 37 homing head.

1336.321

OTOMAT ANTI-SHIP MISSILE (FRANCE/ITALY)

Otomat is the anti-surface version of an all-platforms anti-ship missile. Range is over 80km, but with fuel capacity for greater ranges (200km); speed is in the region of Mach 1. Inertial guidance plus a radar altimeter is used for the low-level cruise phase with active homing for terminal guidance. Two homing heads may be fitted, one manufactured by the Italian SMA company and the other by Thomson-CSF of France, thereby providing for either a sea-skimming or a climb-and-dive final trajectory. Two lateral boosters are employed for initial acceleration in the helicopter version but these are not always required for the aircraft version. A more detailed description appears in **1336.221** in the Shipborne Surface-to-Surface Weapons section of this book.

DEVELOPMENT

Studies are underway for the adaptation of Otomat to other aircraft. A series of completely guided firings has been made so far to demonstrate and evaluate the long range capability, and the shape of the final attack pattern.

Air-to-surface version of the Otomat anti-ship missile

Development continued until 1974, followed by evaluation by the Italian Navy, which has already signed a contract for the surface-to-surface version.

MANUFACTURERS

Engins Matra, 78140 Velizy, France.

OTO Melara, La Spezia, Italy.

1771.311

HOT AIR-TO-SURFACE MISSILE

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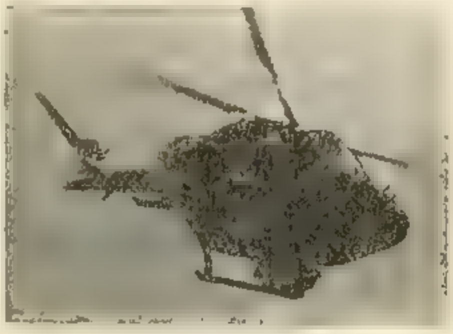
Depending upon the type of helicopter used, four, six or eight launcher ramps to accept the HOT combined container-launch-tube can be fitted, and these are elevation-slaved to the line-of-sight. For helicopter operation, a stabilised optical sighting system, APX397, is used, this being derived from the APX334 sight described in **7032.393** in the Equipment Section of this book.

The guidance system includes a triple-field infra-red 'localiser', with a 10° acquisition field, a 5° tracking field, and 1° tracking field. The function of the infra-red localiser is to establish the position of the HOT missile relative to the line-of-sight (which normally will be maintained on target by the operator using his optical sight). Appropriate guidance signals are computed and transmitted via the command wire to maintain the missile on the line-of-sight to the target.



HOT installation on Lynx helicopter has eight missiles

Six HOT missiles are carried in this Gazelle helicopter installation

MANUFACTURERS

Management, sales, and production responsibilities rest at Euromissile, 7 rue Béranger, BP 84, 92320 Chatillon, France.

ITALY

1651.321

MARTE HELICOPTER ANTI-SHIP MISSILE SYSTEM

The purpose of the Marte system is the destruction or disabling of naval craft in 'all weather' conditions by means of sea skimmer missiles launched from helicopters in a stand off position.

The helicopter-borne missile used in conjunction with the Marte Project is the Sea Killer Mk 2 (20km range with 70kg warhead for the Marte version). Easily operated and light equipment only need be carried on board the helicopter since the radar performs navigation search and track of the target as well as guidance of the missile in azimuth (the missiles are autonomous in altitude by means of SISTEL-designed radar altimeter).

Installation of the Marte Weapon System has been carried out on the Agusta/Sikorsky SH 3D helicopter.

A typical installation is pictured in the nearby diagram, the SH3D helicopter shown, fully equipped for

SH-3D helicopter in Marte configuration for surface ...

target. If such signals are received, the homing head will lock on and the missile will operate in a passive homing mode. In the absence of signals, the radar transmitter in the missile will be switched on and a target search, lock on, and tracking sequence will follow to enable the missile to intercept the target.

The RE 576 head is an autonomous automatic search and track radar providing range, bearing, and elevation data from which control signals for the missile autopilot can be derived. An inverse-Cassegrain aerial system is used, with the feed passing through the centre of a ridged-plate main reflector. Energy from the feed is first directed to a semi reflector situated in front of the gimballed reflector plate, before being returned to the latter which is responsible for focusing and steering the beam. Modifications and improvements have been carried out in the course of Kormoran development by MBB and Thomson-CSF.

OPERATION

Several operational modes appear possible with the guidance equipment developed for Kormoran. The major part of the trajectory is travelled under the control of the inertial system and radar altimeter followed by a terminal homing phase on to the target. The latter can be performed by active radar homing or passive homing on to radiation from the target itself. Target designation is performed by the launching aircraft's radar, although a completely blind attack seems possible if the target co-ordinates are known with sufficient accuracy. Provision is also made for optical target designation for the engagement of targets of opportunity.

A typical F-104 Kormoran sortie envisages a low level approach to a known target followed by a brief climb to above the radar horizon when the aircraft radar is turned on briefly to acquire the target. Upon acquisition the pilot transmits the relative position of the target into his autonomous navigation system and turns off the nose radar. The aircraft then manoeuvres into an appropriate attack position and when this has been reached another brief radar transmission is made to establish target position. This and other necessary initial data are then automatically inserted into the Kormoran's navigation system. On reaching a predetermined launching range the missile is released and the aircraft makes an immediate break away.

After launch, the missile descends to its programmed flight level. In the first part of its flight it is under inertial guidance, aided by the radar altimeter. At a prescribed distance the inertial system of the missile homing head is activated and an active radar search pattern is initiated. After lock-on has been achieved, the inertial guidance is slaved and corrected in azimuth and range by the seeker head and the missile heads for the target. At a short distance from the target, the missile descends to its final flight level in order to hit the target just above the water line. This is the standard mode, but others are possible.

DEVELOPMENT

Kormoran is the largest missile project so far undertaken in West Germany, and was initiated in 1964 to meet a Navy requirement. Development started in 1967/68 with MBB as prime contractor. The inertial navigation system is most probably the same as that flown in the Nord experimental AS 33 missile.

Tornado naval strike aircraft carrying four Kormoran anti-ship missiles

STATUS

The first air launch, from an F-104G, took place successfully on 19 March 1970.

So far the West German Navy is the only named user for the Kormoran, but interest from the Italian Air Force has been reported, and use with the MRCA is also expected. Production has started and first deliveries began in 1977. An initial production of 350 has been reported.

MANUFACTURERS

Messerschmitt-Bölkow-Blohm GmbH, Munich-Ottobrun, West Germany. (Prime Contractor)

Société Nationale Industrielle Aérospatiale, Division des Engins Tactiques, 2 rue Béranger, 92320 Chatillon, France.

Thomson-CSF, Division des Matériels d'Avionique, 178 boulevard Gabriel Peri, 92-Malakoff, France.

Bodenseewerk Gerätetechnik GmbH, Überlingen West Germany. (Airborne computer, inertial navigation)

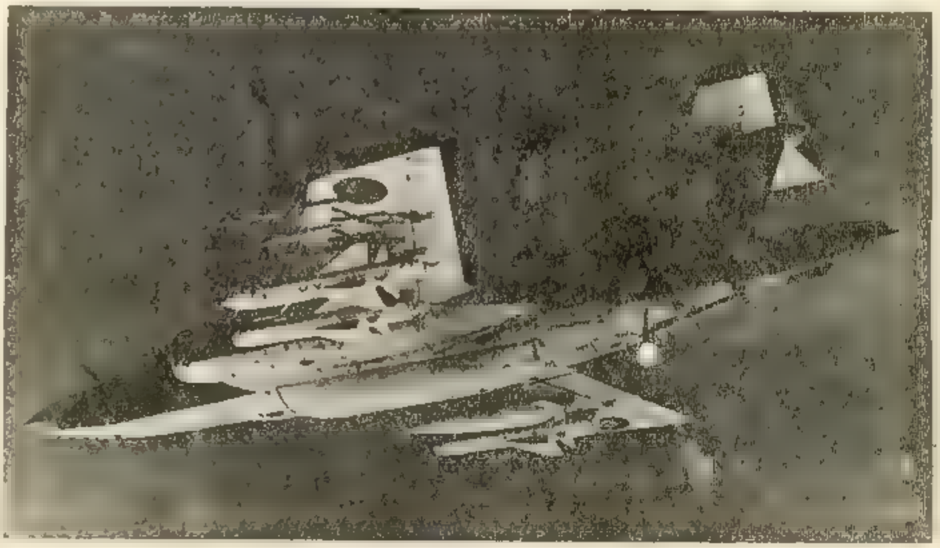
INTERNATIONAL

1022.311

MARTEL AS 37/AJ 168 AIR-TO-SURFACE MISSILE

Martel is an air-to-surface tactical missile with two alternative terminal guidance systems capable of offering a considerable stand-off capability. Both versions are designed to operate in an ECM environment, to which a high resistance is claimed. The forms of terminal guidance are: passive homing on to electromagnetic radiation in the AS 37 anti-radar version, and visual guidance to a selected target by means of a nose-mounted TV camera and a data link over which both video and command signals are passed between aircraft and missile in the AJ 168 variant. The Martel system is the product of a joint Anglo/French development programme with prime responsibility for the AS 37 resting with Engins Matra and for the AJ 168 with British Aerospace Dynamics Group.

General configuration of the missiles can be seen from the diagram at the beginning of this section and photographs adjacent to this entry. Length of the AJ 168 is 390cm, and of the AS 37 420cm; body diameter and wingspan, respectively, for both versions are 40cm and 120cm. No details of performance have been revealed, but range has been officially stated both as 'several tens of miles' and 'several tens of kilometres'. This suggests a range of about 60km although maximum range will be to some extent dependent upon the height of launch and subsequent trajectory.



Buccaneer armed with one anti-radiation Martel and two TV-guided Martels. Note Martel data-link/control pod on starboard inner wing station

OPERATION

Both versions of Martel probably employ the same basic autopilot which provides guidance until either TV or radar homing systems assume control for the terminal guidance phase. There are some indications that the autopilot can be pre-programmed to provide several options of mission profile. A fundamental difference, in addition to the guidance system, is related to the two-stage propulsion assembly which is adapted to the mission requirements specific to each version.

Martel AS 37. The Electronique Marcel Dassault AD 37 homing head is believed to use a movable receiver aerial, possibly of the inverse-Cassegrain type, and this is used both prior and subsequent to launch from the aircraft. Prior to launch, the AD 37 provides data for the pilot for navigation to, and determination of, launch point. These data are presented via the aircraft equipment, and probably consist of initial warning of hostile radar signals, followed by information on their aspect relative to the aircraft. After launch, the AD 37 head locks on to the radar target and generates guidance signals for the auto-pilot to direct the missiles to the target. Missile control is by means of four movable fins placed a short distance behind the cruciform wings.

Martel AJ.168. Whereas radiation by the opposing radar is necessary for the AS 37 version of Martel to operate, the TV-guided variant is designed to keep radar contact to a minimum, and for this reason it is more likely to be launched from a low altitude, preferably while the launch aircraft itself is still beyond radar range. Launch is made from a known geographical position and the weapon is directed from the launch aircraft along a calculated track to the target.

A TV camera in the nose produces pictures of the

to remain in service until the late 1980s or later

MANUFACTURERS

British Aerospace Dynamics Group, Manor Road Hatfield, Hertfordshire AL10 9LL, England. Subcontractors include

Sperry Gyroscope – flight controls, Marconi Space and Defence Systems – missile guidance, Vickers Shipbuilding Group – magazine handling gear and launcher

2442 231

SEAWOLF SURFACE-TO-AIR MISSILE

Seawolf is the missile used in the Royal Navy's short-range self defence missile system, GWS25. The system is designed to provide rapid reaction defence against both aircraft and anti-ship missiles. It is capable of installation in new and existing small escort vessels down to about 3000 tons full load, as well as in larger vessels. A lightweight derivative of the GWS25 system, known as Seawolf VM40 has been studied for fitting in much smaller vessels of corvette size or possibly as little as 800 tons.

The Seawolf missile employs line-of-sight guidance with radar differential tracking or television, both with radio command. Speed and manoeuvrability characteristics are suitable for the engagement of small Mach 2 missile and aircraft targets under severe weather conditions and sea states.

The complete GWS25 system comprises the following units:

Air and low air surveillance radars Type 967 and 968

Radar trackers Type 910 and TV trackers

Command transmitter

Launcher and firing system

Missile and handling frame

Data handling

Guidance Shaping Unit

Operations Consoles

Magazines

The Type 910 tracking radar is produced by Marconi and is described more fully in the Equipment Section (1562 253). The TV system is produced by Marconi-Elliot. The Type 967 and Type 968 surveillance radars provide both high and low cover and also are produced by Marconi (1561 253). They are of modern design and incorporate features for air target detection up to high elevation angles as well as high performance against low-level and surface targets. Comprehensive precautions against sea and land clutter as well as natural and man made interference are incorporated as is IFF.

The line-of-sight to a target is established by either the tracking radar or the TV system. Error signals proportional to Seawolf missile deviations from this datum are derived from the differential tracking radar or the TV system and these signals are processed by a guidance shaping unit. Coded correction signals for missile guidance are produced and transmitted by microwave command link to bring the missile to the required flight path. In the GWS25 system the data processing required to interpret the tracking data and calculate the correction demand signals is based on the use of a Ferranti FM 1600B computer (1433 063) which has been adopted as a standard.

A multiple launcher developed by Vickers Shipbuilding Group Ltd bears the designation Mk 25 Mod 0 and consists of six rectangular launch-tubes disposed in two banks of three, one on each side of an az/el mounting. Reloading is manual, presumably to avoid the complexity and, particularly, the weight of an automatic system which might undesirably limit the number of ships which can carry the full Seawolf system. The launcher is separate from the tracking radar. High slewing rate and pointing accuracy are important features of the Seawolf launcher which is equipped for fully automatic firing sequence, with command override.

The Seawolf missile weighs approximately 80kg at

launch, is about 2m in length, and has four fixed wings and four moving tail fins. A solid booster motor is stated to give minimal launch drop and speed is quoted as being in excess of Mach 2. Successful techniques employed in Rapier (2424.131) have been incorporated and no on-board test or repair facilities for missiles are called for. The HE warhead is provided with both proximity and contact fuzing.

OPERATION

For the successful interception of an incoming anti-ship missile great accuracy and an extremely short reaction time are required of the system. To achieve this it is arranged that, once a target has been identified as hostile, all subsequent phases of the launch and guidance operation will be carried out automatically and without further manual control.

Other relevant features include the ability to fire salvoes, immediate readiness capability maintained over long periods, and extremely fast data handling facilities in all parts of the system.

Automatic radar guidance is the normal operating mode, with TV tracking by an aimer for low angle of sight and surface target engagement.

VARIANTS

Seawolf VM 40

In place of the GWS 25 system's Type 910 tracking radar, the Anglo/Dutch VM 40 tracker system derived from the Hollandse Signaalapparaten STIR tracker used in the Dutch Standard frigates for Sea Sparrow guidance is employed. Potential advantages are more recent design, and at 3.5 tons, an appreciable saving in weight. In particular it gives an ability to track accurately the lowest targets by radar without the aid of a television system by application of a dual frequency band radar. Video processing using Fast Fourier Transformation techniques enables the system to look through various simultaneous types of clutter (eg sea, rain and land clutter) giving optimum separation of incoming missiles and outgoing Seawolf missiles.

A further significant saving in system weight will

Model and cutaway drawing of the new twin launcher/reload equipment for the latest VM 40 Lightweight Seawolf system

Seawolf launch during MoD trials

come from the substitution of a lightweight (circa two tons) twin-round launcher from Vickers Shipbuilding Group for the six-container launcher used in the GWS 25. In the new design a rapid power loading system is provided to feed the missiles to the launcher from a ready use magazine below. This can be loaded fast enough to match the engagement cycle of the remainder of the system.

STATUS

Seawolf entered Royal Navy service in 1979 aboard HMS *Broadsword*, first of the Type 22 class of frigates. The system will be installed retrospectively on Leander class frigates, as well as subsequent Type 22 ships. The first guided round firing of the Seawolf VM 40 system took place in January 1980 at Aberporth missile range in Wales.

MANUFACTURERS

Missile: British Aerospace Dynamics Group Ltd

Radar: Marconi Radar Systems Ltd

Television: Marconi-Elliot Avionics System Ltd

Computer: Ferranti Ltd.

Launcher: Vickers Shipbuilding Group Ltd.

2446 231

SLAM CLOSE RANGE WEAPON SYSTEM

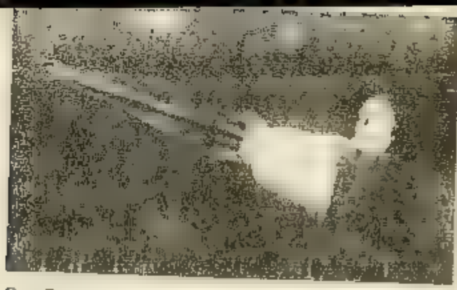
The initials SLAM stand for Submarine Launched Air Missile system. This system has been developed by Vickers to meet the need of submarines for an effective short range defence against surface craft and helicopters.

For target engagement the system uses the Blowpipe (2409.131) missile for which a special multiple launcher is provided. This carries six missiles clustered around a central electronics enclosure which contains part of the missile control equipment, television system, and gyro subsystem for launcher stabilisation. A GRP (Glass Reinforced Plastic) Pressure Vessel built into the submarine's fin conceals and protects the SLAM armament. A periscopic mast enables the launcher to be fully deployed from the stowed position within a few seconds.

Control room equipment consists of an operator's display console, electronics cubicle which houses the power supplies, and launcher control electronics. An additional feature is a trainer/simulator which can be plugged into the display console to give the operator at sea training against simulated targets. Built-in test facilities are provided to enable routine servicing and rapid system checks to be carried out without the need for specialist personnel.

OPERATION

One operator is required. Target acquisition is by means of attack periscope, the launcher being automatically aligned with the target in azimuth when the launcher mast is raised. The operator then seeks the target's elevation and tracks it on his TV



Sea Dart missile launch from a box launcher as part of the Lightweight Sea Dart system development programme

Sea Dart missile launch

system will detect very small changes in target movement. This capability combined with very fast control responses enables very small miss distances to be achieved.

CHARACTERISTICS

Designation: GWS 30

Type: Shipborne area defence, surface-to-air, surface-to-surface, and anti-missile guided weapon system

Guidance principle: Radar guidance and semi-active homing using Tracker Illuminator Radar type 909

Guidance method: By control of movable tail surfaces

Propulsion: Solid-propellant booster and ramjet sustainer

Warhead. Presumably high-explosive

Length: 4.36m

Body diameter. 42cm

Span: 91cm

Launch weight: 550kg

Range: At least 30km

OPERATION

Fully automatic magazine handling and loading arrangements. Missiles are stowed vertically in magazines and are hoisted through an intermediate-stage to the electrically driven twin launcher. Targets are designated to the system in three co-ordinates by radar. The system automatically tracks the target and points the launcher. Radar illuminates the target to provide the missile with the RF signal for self-guidance on to the target. The Type 909 target tracking and illuminating radar (1559.253) produced by Marconi Radar Systems has been developed from the equipment used with certain Bloodhound and Thunderbird missile systems. The missile is boosted to speed by a solid fuel tandem boost and speed is sustained by an Odin ramjet burning a liquid fuel.

LIGHTWEIGHT SEA DART

In 1978 British Aerospace announced the Lightweight Sea Dart system, intended for ships down to 300 tons in size. In place of the GWS 30 missile launcher and missile magazine, the lightweight system employs deck-mounted containers which protect the missile and also act as the missile launcher. The number and siting of these units depends on particular ship configurations and customer/operational requirements, but typically a small craft might fit two groups of four missiles. An illuminating radar is required, with the antenna either having its own turning gear (slaved to the ship's tracking radar) or physically attached to the tracker. The ship's surveillance radar is used to provide initial target detection and to lay on the tracker. The performance of Lightweight Sea Dart is dependent on the capabilities of the surveillance and tracking radars fitted. Studies of modern naval radars indicate that in the surface-to-surface role Sea Dart will match other missiles while providing better performance in the air defence role.

DEVELOPMENT

Development started August 1962. Test firings began in 1965 and the first production order was announced in November 1967.

The Royal Navy was said to be considering funding development of an advanced version of Sea Dart which would serve for the rest of this century (see below).

STATUS

Development is complete and the system is at sea in HMS *Bristol* and Type 42 destroyers of the 'Sheffield' class. It is also in service with the Argentine Navy in ARA *Hercules* and is being fitted to a second Argentine Type 42 being built in Buenos Aires. Sea Dart will also provide area defence for the new class of Anti-submarine Cruiser the first of which, HMS *Invincible*, was launched in 1977.

In August 1977 the Minister of State for Defence announced the start of a project to define major improvements to Sea Dart to enable it to meet changing threat conditions, particularly in respect of ECM. It is expected HMS *Sheffield* will be the first ship to be fitted with the up-dated system.

The Sea Dart system is in operational service with the Royal Navy on HMS *Bristol* (Type 82 command cruiser), and on all Type 42 destroyers, and is fitted in HMS *Invincible*, first-of-class of the RN's new anti-submarine cruisers. The system is also used by the Armada Republica Argentina.

MANUFACTURERS

System contractor is British Aerospace Dynamics Group, Manor Road, Hatfield, Hertfordshire AL10 9LL, England. Other contractors associated with the system include:

Marconi Space and Defence Systems Ltd – Guidance. Rolls Royce (1971) Ltd – Odin Ramjet. Sperry Gyroscope division of Sperry Rand Ltd – Missile Control. EMI – Fuze. Vickers Shipbuilding Group Ltd – Launcher Magazine and Handling Equipment. Marconi Radar Systems, Ltd – Type 909 Tracker Illuminator Radar. Ferranti Ltd – Computer and Data Handling. Plessey Radar Ltd – Operations Room Equipment.

6003.231

SEASLUG SURFACE-TO-AIR MISSILE

Seaslug is a long-range beam-riding shipborne surface-to-air guided missile system.

Targets are detected at long range by radar (3-D or surveillance plus heightfinder) and their co-ordinates are supplied to the missile system control which commands the launcher. A twin ramp launcher is used and is reloaded from a between decks magazine.

There are two versions of the missile, the Mk 2 having a rather longer range and better performance against low-flying aircraft. Both missiles have a surface-to-surface capability, but again that of the Mk 2 is better than that of the Mk 1.

CHARACTERISTICS

Type: Shipborne surface-to-air tactical guided missile. Surface-to-surface capability

Guidance principle: Beam-riding using type 901 M shipborne radar with coded transmissions

Guidance method. By control of tail surfaces

Propulsion: Solid-propellant sustainer with four wrap-around solid-propellant boosters

Warhead. High explosive with proximity fuze

Missile length. 6m

Missile diameter: 41cm

Range: Probably better than 45km. Targets engaged at heights above 15 000m in trials

Seaslug surface-to-air missile launch

OPERATION

Fully automatic magazine handling and loading arrangements. Electrically driven twin launcher. Targets are designated to the system in three co-ordinates by radar. The system automatically tracks the target and points the launcher. When the target comes within range the missile is fired and intercepts the target using beam-riding guidance techniques. Typical radars are the RN Type 965 (1560.253) for primary long range surveillance, Type 277 for height finding, and the Type 901 which is the Seaslug tracking and illuminating radar. HE warhead with DA and proximity fuzes. Four wrap round boosters.

DEVELOPMENT

Development started in the early 1950s. Prototype trials carried out in HMS *Girdleness* during late 1950s. First fitted in 'County' class destroyers in 1961.

STATUS

Mk 1 system fitted in HM ships *Devonshire*, *Kent*, and *London*. Mk 2 system fitted in HM Ships *Glamorgan*, *Fife*, *Norfolk*, and *Antrim*. Now expected

to remain in service until the late 1980s, or later
MANUFACTURERS
British Aerospace Dynamics Group Manor Road Hatfield, Hertfordshire AL10 9LL, England. Subcontractors include
Sperry Gyroscope – flight controls, Marconi Space and Defence Systems – missile guidance, Vickers Shipbuilding Group – magazine handling gear and launcher

2442.231
SEAWOLF SURFACE-TO-AIR MISSILE

Seawolf is the missile used in the Royal Navy's short-range self-defence missile system, GWS25. The system is designed to provide rapid reaction defence against both aircraft and anti-ship missiles. It is capable of installation in new and existing small escort vessels down to about 3000 tons full load as well as in larger vessels. A lightweight derivative of the GWS25 system, known as Seawolf VM40 has been studied for fitting in much smaller vessels of corvette size or possibly as little as 800 tons.

The Seawolf missile employs line-of-sight guidance with radar differential tracking or television both with radio command. Speed and manoeuvrability characteristics are suitable for the engagement of small Mach 2 missile and aircraft targets under severe weather conditions and sea states.

The complete GWS25 system comprises the following units:

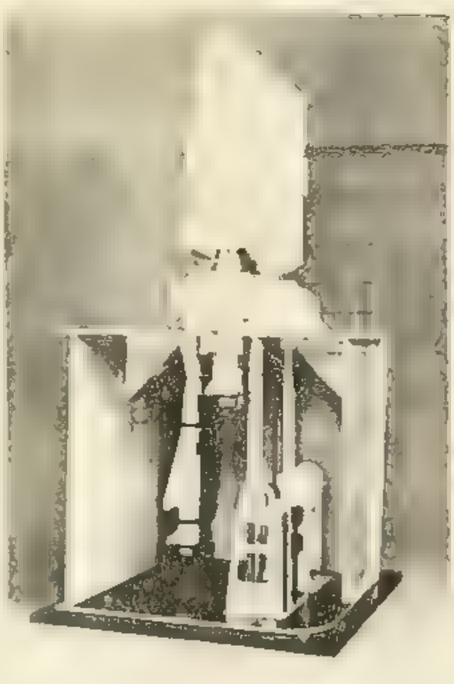
Air and low-air surveillance radars Type 967 and 968
Radar trackers Type 910 and TV trackers
Command transmitter
Launcher and firing system
Missile and handling frame
Data handling
Guidance Shaping Unit
Operations Consoles
Magazines

The Type 910 tracking radar is produced by Marconi and is described more fully in the Equipment Section (1562 253). The TV system is produced by Marconi-Elliot. The Type 967 and Type 968 surveillance radars provide both high and low cover and also are produced by Marconi (1561 253). They are of modern design and incorporate features for air target detection up to high elevation angles as well as high performance against low-level and surface targets. Comprehensive precautions against sea and land clutter as well as natural and man-made interference are incorporated as is IFF.

The line-of-sight to a target is established by either the tracking radar or the TV system. Error signals proportional to Seawolf missile deviations from this datum are derived from the differential tracking radar or the TV system and these signals are processed by a guidance shaping unit. Coded correction signals for missile guidance are produced and transmitted by microwave command link to bring the missile to the required flight path. In the GWS25 system the data processing required to interpret the tracking data and calculate the correction demand signals is based on the use of a Ferranti FM 1600B computer (1433 063) which has been adopted as a standard.

A multiple launcher developed by Vickers Shipbuilding Group Ltd bears the designation Mk 25 Mod 0 and consists of six rectangular launch-tubes disposed in two banks of three, one on each side of an azel mounting. Reloading is manual, presumably to avoid the complexity and particularly the weight of an automatic system which might undesirably limit the number of ships which can carry the full Seawolf system. The launcher is separate from the tracking radar. High slewing rate and pointing accuracy are important features of the Seawolf launcher which is equipped for fully automatic firing sequence with command override.

The Seawolf missile weighs approximately 80kg at launch, is about 2m in length, and has four fixed wings and four moving tail fins. A solid booster motor is stated to give minimal launch drop and speed is quoted as being in excess of Mach 2. Successful techniques employed in Rapier (2424.131) have been incorporated and no on-board test or repair facilities for missiles are called for. The HE warhead is provided with both proximity and contact fuzing.



Model and cutaway drawing of the new twin launcher/reload equipment for the latest VM 40 Lightweight Seawolf system

Seawolf launch during MoD trials

OPERATION

For the successful interception of an incoming anti-ship missile great accuracy and an extremely short reaction time are required of the system. To achieve this it is arranged that, once a target has been identified as hostile, all subsequent phases of the launch and guidance operation will be carried out automatically and without further manual control.

Other relevant features include the ability to fire salvoes, immediate readiness capability maintained over long periods, and extremely fast data handling facilities in all parts of the system.

Automatic radar guidance is the normal operating mode with TV tracking by an aimer for low angle of sight and surface target engagement.

VARIANTS

Seawolf VM 40

In place of the GWS 25 system's Type 910 tracking radar, the Anglo-Dutch VM 40 tracker system derived from the Hollandse Signaalapparaten STIR tracker used in the Dutch Standard frigates for Sea Sparrow guidance is employed. Potential advantages are more recent design, and at 3.5 tons, an appreciable saving in weight. In particular it gives an ability to track accurately the lowest targets by radar without the aid of a television system by application of a dual frequency band radar. Video processing using Fast Fourier Transformation techniques enables the system to look through various simultaneous types of clutter (eg sea, rain and land clutter) giving optimum separation of incoming missiles and outgoing Seawolf missiles.

A further significant saving in system weight will come from the substitution of a lightweight (circa two tons) twin-round launcher from Vickers Shipbuilding Group for the six-container launcher used in the GWS 25. In the new design a rapid power loading system is provided to feed the missiles to the launcher from a ready use magazine below. This can be loaded fast enough to match the engagement cycle of the remainder of the system.

STATUS

Seawolf entered Royal Navy service in 1979 aboard HMS *Broadsword*, first of the Type 22 class of frigates. The system will be installed retrospectively on Leander class frigates, as well as subsequent Type 22 ships. The first guided round firing of the Seawolf VM 40 system took place in January 1980 at Aberporth missile range in Wales.

MANUFACTURERS
Missile: British Aerospace Dynamics Group Ltd
Radar: Marconi Radar Systems Ltd
Television: Marconi-Elliot Avionics System Ltd.
Computer: Ferranti Ltd
Launcher: Vickers Shipbuilding Group Ltd

2446.231
SLAM CLOSE RANGE WEAPON SYSTEM

The initials SLAM stand for Submarine Launched Air Missile system. This system has been developed by Vickers to meet the need of submarines for an effective short-range defence against surface craft and helicopters.

For target engagement the system uses the Blowpipe (2409 131) missile for which a special multiple launcher is provided. This carries six missiles clustered around a central electronics enclosure which contains part of the missile control equipment, television system and gyro subsystem for launcher stabilisation. A GRP (Glass Reinforced Plastic) Pressure Vessel built into the submarine's fin conceals and protects the SLAM armament. A periscopic mast enables the launcher to be fully deployed from the stowed position within a few seconds.

Control room equipment consists of an operator's display console, electronics cubicle which houses the power supplies and launcher control electronics. An additional feature is a trainer/simulator which can be plugged into the display console to give the operator at sea training against simulated targets. Built-in test facilities are provided to enable routine servicing and rapid system checks to be carried out without the need for specialist personnel.

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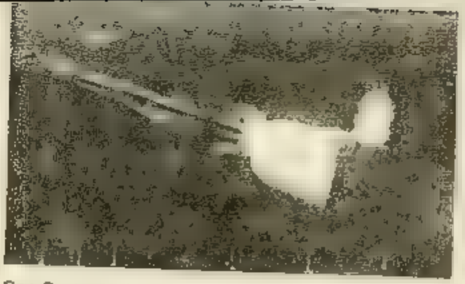
One operator is required. Target acquisition is by means of attack periscope, the launcher being automatically aligned with the target in azimuth when the launcher mast is raised. The operator then seeks the target's elevation and tracks it on his TV



Sea Dart missile launch from a box launcher as part of the Lightweight Sea Dart system development programme

system will detect very small changes in target movement. This capability combined with very fast control responses enables very small miss distances to be achieved.

CHARACTERISTICS

Designation: GWS 30

Type: Shipborne area defence surface-to-air, surface-to-surface, and anti-missile guided weapon system

Guidance principle: Radar guidance and semi-active homing using Tracker Illuminator Radar type 909

Guidance method: By control of movable tail surfaces

Propulsion: Solid-propellant booster and ramjet sustainer

Warhead: Presumably high-explosive

Length: 4.36m

Body diameter: 42cm

Span: 91cm

Launch weight: 550kg

Range: At least 30km

OPERATION

Fully automatic magazine handling and loading arrangements. Missiles are stowed vertically in magazines and are hoisted through an intermediate-stage to the electrically driven twin launcher. Targets are designated to the system in three co-ordinates by radar. The system automatically tracks the target and points the launcher. Radar illuminates the target to provide the missile with the RF signal for self-guidance on to the target. The Type 909 target tracking and illuminating radar (1559.253) produced by Marconi Radar Systems has been developed from the equipment used with certain Bloodhound and Thunderbird missile systems. The missile is boosted to speed by a solid fuel tandem boost and speed is sustained by an Odin ramjet burning a liquid fuel.

LIGHTWEIGHT SEA DART

In 1978 British Aerospace announced the Lightweight Sea Dart system, intended for ships down to 300 tons in size. In place of the GWS 30 missile launcher and missile magazine, the lightweight system employs deck-mounted containers which protect the missile and also act as the missile launcher. The number and siting of these units depends on particular ship configurations and customer/operational requirements, but typically a small craft might fit two groups of four missiles. An illuminating radar is required, with the antenna either having its own turning gear (slaved to the ship's tracking radar) or physically attached to the tracker. The ship's surveillance radar is used to provide initial target detection and to lay on the tracker. The performance of Lightweight Sea Dart is dependent on the capabilities of the surveillance and tracking radars fitted. Studies of modern naval radars indicate that in the surface-to-surface role Sea Dart will match other missiles while providing better performance in the air defence role.

Sea Dart missile launch

DEVELOPMENT

Development started August 1962. Test firings began in 1965 and the first production order was announced in November 1967.

The Royal Navy was said to be considering funding development of an advanced version of Sea Dart which would serve for the rest of this century (see below).

STATUS

Development is complete and the system is at sea in HMS *Bristol* and Type 42 destroyers of the 'Sheffield' class. It is also in service with the Argentine Navy in ARA *Hercules* and is being fitted to a second Argentine Type 42 being built in Buenos Aires. Sea Dart will also provide area defence for the new class of Anti-submarine Cruiser the first of which, HMS *Invincible*, was launched in 1977.

In August 1977 the Minister of State for Defence announced the start of a project to define major improvements to Sea Dart to enable it to meet changing threat conditions, particularly in respect of ECM. It is expected HMS *Sheffield* will be the first ship to be fitted with the up-dated system.

The Sea Dart system is in operational service with the Royal Navy on HMS *Bristol* (Type 82 command cruiser), and on all Type 42 destroyers, and is fitted in HMS *Invincible*, first-of-class of the RN's new anti-submarine cruisers. The system is also used by the Armada Republica Argentina.

MANUFACTURERS

System contractor is British Aerospace Dynamics Group, Manor Road, Hatfield, Hertfordshire AL10 9LL, England. Other contractors associated with the system include:

Marconi Space and Defence Systems Ltd – Guidance. Rolls Royce (1971) Ltd – Odin Ramjet. Sperry Gyroscope division of Sperry Rand Ltd – Missile Control. EMI – Fuze. Vickers Shipbuilding Group Ltd – Launcher Magazine and Handling Equipment. Marconi Radar Systems, Ltd – Type 909 Tracker Illuminator Radar. Ferranti Ltd – Computer and Data Handling. Plessey Radar Ltd – Operations Room Equipment.

6003.231

SEASLUG SURFACE-TO-AIR MISSILE

Seaslug is a long-range beam-riding shipborne surface-to-air guided missile system.

Targets are detected at long range by radar (3-D or surveillance plus heightfinder) and their co-ordinates are supplied to the missile system control which commands the launcher. A twin ramp launcher is used and is reloaded from a between-decks magazine.

There are two versions of the missile, the Mk 2 having a rather longer range and better performance against low flying aircraft. Both missiles have a surface-to-surface capability, but again that of the Mk 2 is better than that of the Mk 1.

CHARACTERISTICS

Type: Shipborne surface-to-air tactical guided missile. Surface-to-surface capability

Guidance principle: Beam-riding using type 901 M shipborne radar with coded transmissions

Guidance method: By control of tail surfaces

Propulsion: Solid-propellant sustainer with four wrap-around solid-propellant boosters

Warhead: High-explosive with proximity fuze

Missile length: 6m

Missile diameter: 41cm

Range: Probably better than 45km. Targets engaged at heights above 15 000m in trials

Seaslug surface-to-air missile launch

OPERATION

Fully automatic magazine handling and loading arrangements. Electrically driven twin launcher. Targets are designated to the system in three co-ordinates by radar. The system automatically tracks the target and points the launcher. When the target comes within range the missile is fired and intercepts the target using beam-riding guidance techniques. Typical radars are the RN Type 965 (1560.253) for primary long-range surveillance, Type 277 for height finding, and the Type 901 which is the Seaslug tracking and illuminating radar. HE warhead with DA and proximity fuzes. Four wrap round boosters.

DEVELOPMENT

Development started in the early 1950s. Prototype trials carried out in HMS *Girdleness* during late 1950s. First fitted in 'County' class destroyers in 1961.

STATUS

Mk 1 system fitted in HM ships *Devonshire*, *Kent*, and *London*. Mk 2 system fitted in HM Ships *Glamorgan*, *Fife*, *Norfolk*, and *Antrim*. Now expected

ARMADA ARGENTINA

SECRETO

Nº 02 /82 "S"
Letra JEIN,0C9.15

BUENOS AIRES, 8 de abril de 1982.

OBJETO: Elevar información de la ARMADA BRITANICA.

AL SEÑOR JEFE DEL DEPARTAMENTO DE INTELIGENCIA DEL COMANDO DE OPERACIONES NAVALES.

De acuerdo a lo requerido agregado elevo información de radares.

Oportunamente enviaré la información faltante.

AGREGADOS: Lo mencionado.
DISTRIBUCION: Original: destinatario
Duplicado: Archivo División INTELIGENCIA MILITAR

ESTADO MAYOR GENERAL DE LA ARMADA
DEPARTAMENTO "B"
JEFATURA DE INTELIGENCIA

JOSE ALBERTO NADAL
CAPITAN DE FRAGATA
Jefe de Gdia. del Dto. "B"

TIPO 982

Propósito: Alerta aérea y superficie.

Frecuencia: 3.000 MHZ (10 cm) BANDA S (actualmente Banda E/F)

POTENCIA: 5000 KW PICO

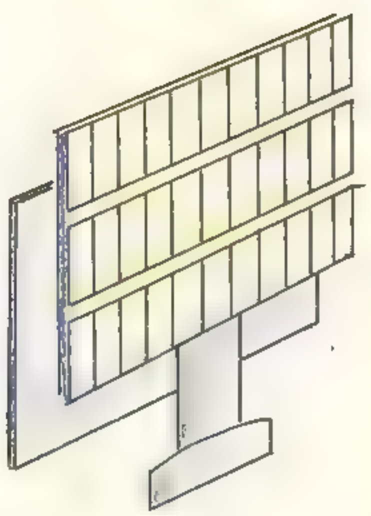
F.R.P.: 500 p/seg.

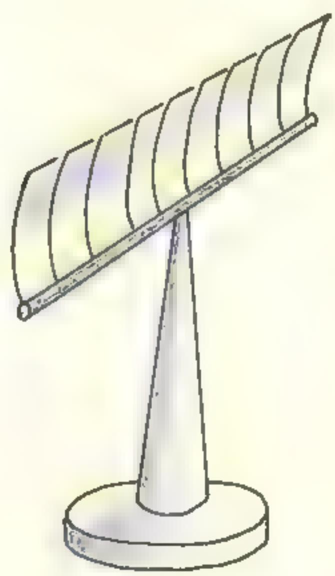
D.P: 0,7 ó 1,9 μs

ANTENA: TIPO AQS (puede instalarse con otras antenas)

COMENTARIO: Equipo antigua - instalado generalmente en Destructores de la clase LEANDER y en otras unidades de la misma antigüedad.

DIBUJO APROXIMADO DE LA ANTENA





AKR

D.P.: 34 μs modulado en frecuencia (Chirp). ó 64 μs modulador en frecuencia (chirp)

Nota: Estos pulsos se utilizan para detección aire lejana. Para detección superficie, a cualquiera de los pulsos de 1 μs de duración sin modular.

Primera velocidad "ciega" del MTI: Macli 5

TIPO 1022

PROPOSITO: Alerta aire y superficie de gran alcance

FRECUENCIA: No se conoce

POTENCIA: No se conoce

FRP: No se conoce

DP: No se conoce.

COMENTARIOS: Desarrollo conjunto de SIGNAAL (transmisor-receptor) y MARCONI (antena) , destinado a reemplazar al radar de alerta aire 965.

El Radar 1022 se habría instalado en el Portaaviones HMS "INVINCIBLE"

No se conocen los parámetros del radar 1022 pero se puede suponer que probablemente el transmisor receptor sea un derivado del radar SIGNAL LW08, que tiene las siguientes características:

LW08
Propósitos: Alerta aérea, superficie y designación de blancos.

PERFORMANCE: Para un blanco de $2 mm^2$, con probabilidad de detección de 50 % , probabilidad de falsa alarma de 10^{-6}, fluctuación SW1 y velocidad de rotación de antena de 7,5 rpm:
Alcance: 130 NM
Altura: 70.000 pies.
cubrimiento en elevación: hasta 45°

FACILIDADES:

1) agilidad de frecuencia pulso a pulso, en una banda de 200 MHZ
2) MTI.
3) IFF Integrado.

CARACTERISTICAS TECNICAS

Reflector- frecuencia 1.200 a 1.400 MHZ (BANDA D)
Ganancia: 30 dB - Haz horizontal: 2,2°
Polarización horizontal o circular
Velocidad de rotación: 7,5 ó 15 rpm.

TRANSMISOR

Frecuencia: 1.200 a 1.400 MHZ (6 frecuencias fijas seleccionables, o agilidad de frecuencia al azar).

POTENCIA:150 KW PICO
P.R.R.: 500 HZ ± 10 % ó 1000 HZ ± 10 %

993

TIPO 944

DIFERENCIA CON PLANILLA

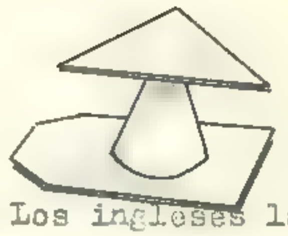
Propósito: Búsqueda superficie.

Frecuencia: Banda E/F (antes S) 10 cm.

Potencia: No se conoce

F.R.P.: No se conoce

L.P: No se conoce.



Antena: De forma triángular
Es la misma que utiliza el radar 993. Los ingleses la denominan "QUARTER CHEESE".

COMENTARIO: Este equipo es una modernización del radar 993, que incorpora el transmisor receptor del PLESSEY AWS-4 (Igual al instalado en el ARA "BAHIA PARAISO"), y la antigua antena del 993. Como opción puede incluir: MTI, IFF MK-10 y doble transmisor para diversidad de frecuencia.

REFERENCIAS DEL AWS-4

FRECUENCIA: Banda E/F- SINTONIZABLE EN LAS BANDAS DE 2,7; 2,9; o 2.9 a 3.1 GHZ.

POTENCIA: 550 KW PICO

FRP: 680 y 1360 p/seg.

D.P: 0,3 μs ó 1 μs

ITEM 70.575

1

ESTRICTAMENTE SECRETO Y CONFIDENCIAL

MISIL A/S "SEA SKUA"

ARMADA ARGENTINA

CONTIENE ______________________

REMITENTE ....

ITEM 70.575

ESTRICTAMENTE SECRETO Y CONFIDENCIAL

SEA KING A/S (Mk 2)

ARMADA ARGENTINA

CONTIENE ______________________

REMITENTE. ____________

ITEM 70.575

ESTRICTAMENTE SECRETO Y CONFIDENCIAL

SEA LYNX HAS Mk 2

ARMADA ARGENTINA

CONTIENE ______________________

REMITENTE. ....

REMITENTE

ITEM 70.575

ESTRICTAMENTE SECRETO Y CONFIDENCIAL

SEA HARRIER FRS Mk 1

ARMADA ARGENTINA

CONTIENE ______________

REMITENTE

N.N.E. 7530-29-007-0573

SILUETAS

ARMADA ARGENTINA

CONTIENE:

SEA HARRIER FRS MK1 5(2)

BATTLEAXE

HERMES

INVINCIBLE


F126

PLYMOUTH


F126

PLYMOUTH

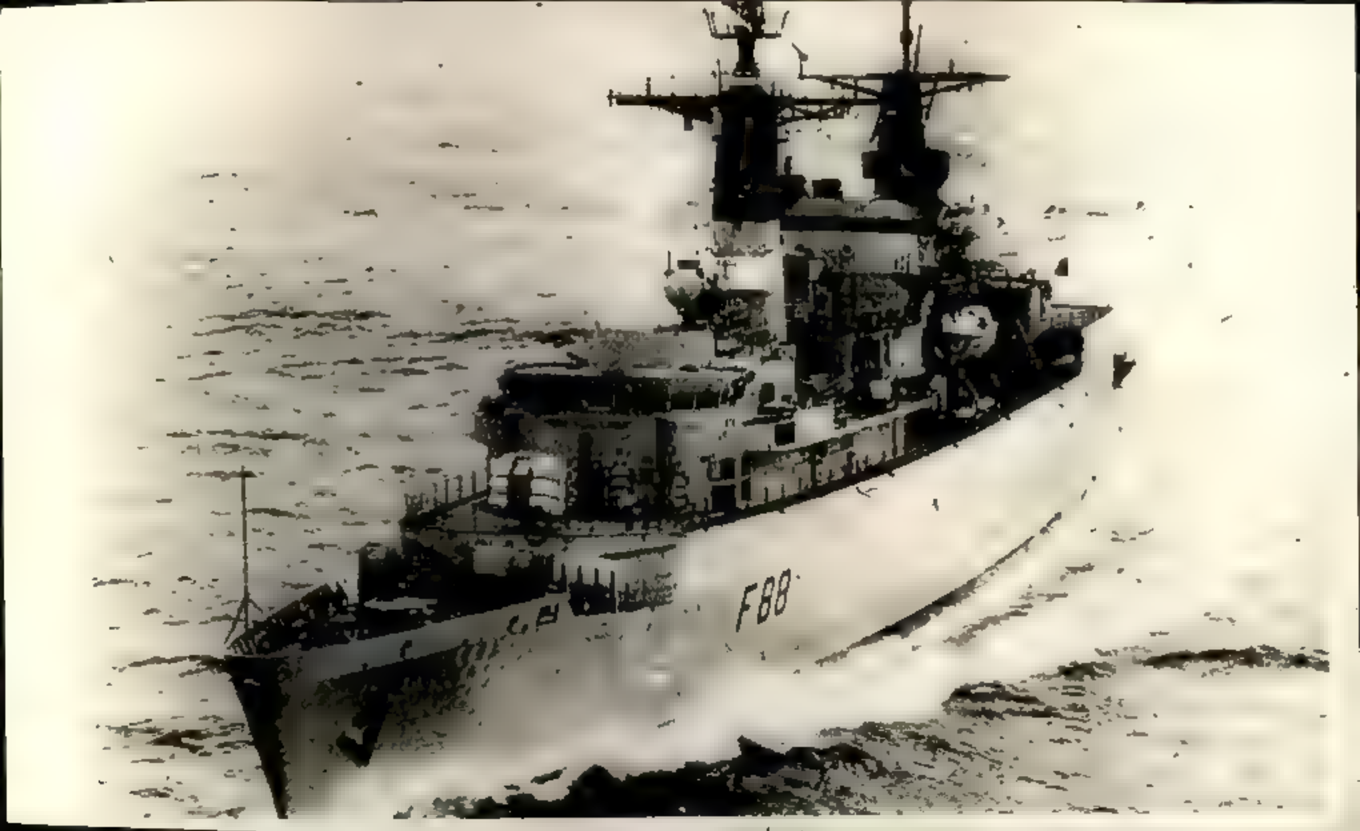

F88

BROADSWORD


L11

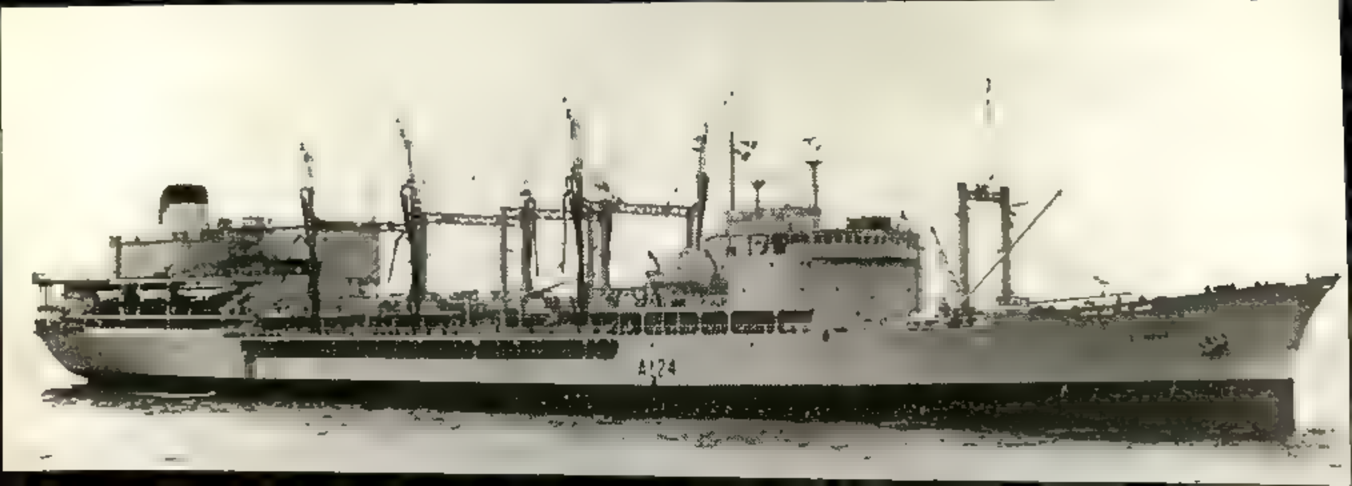
INTREPID

BOONDWARD


F88

S(1)

SEA Harrier FRS MK1


A124

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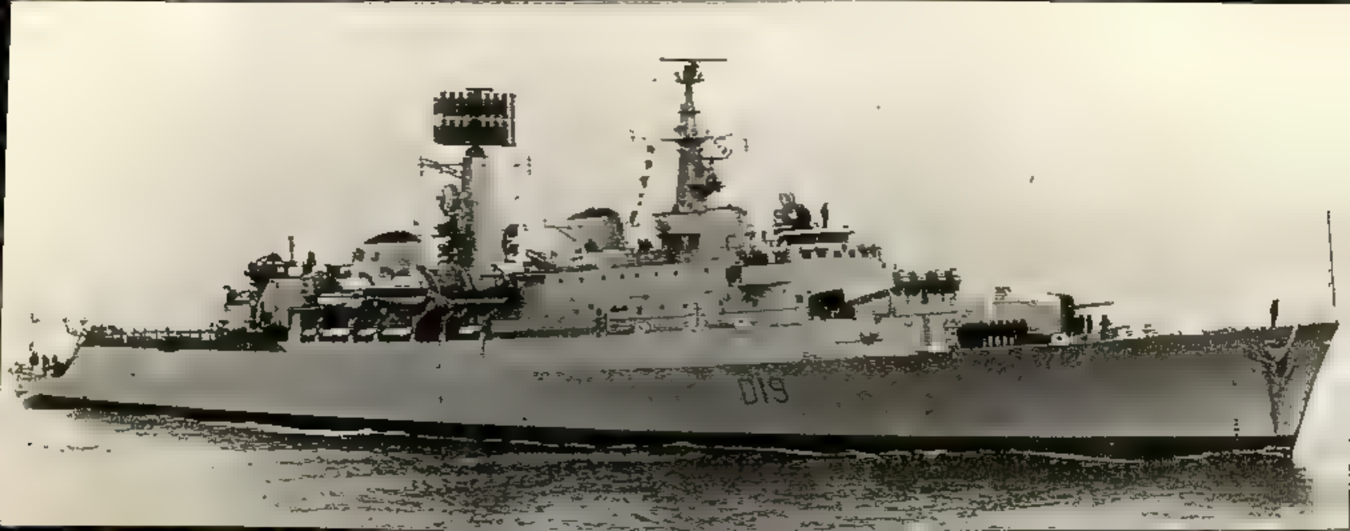
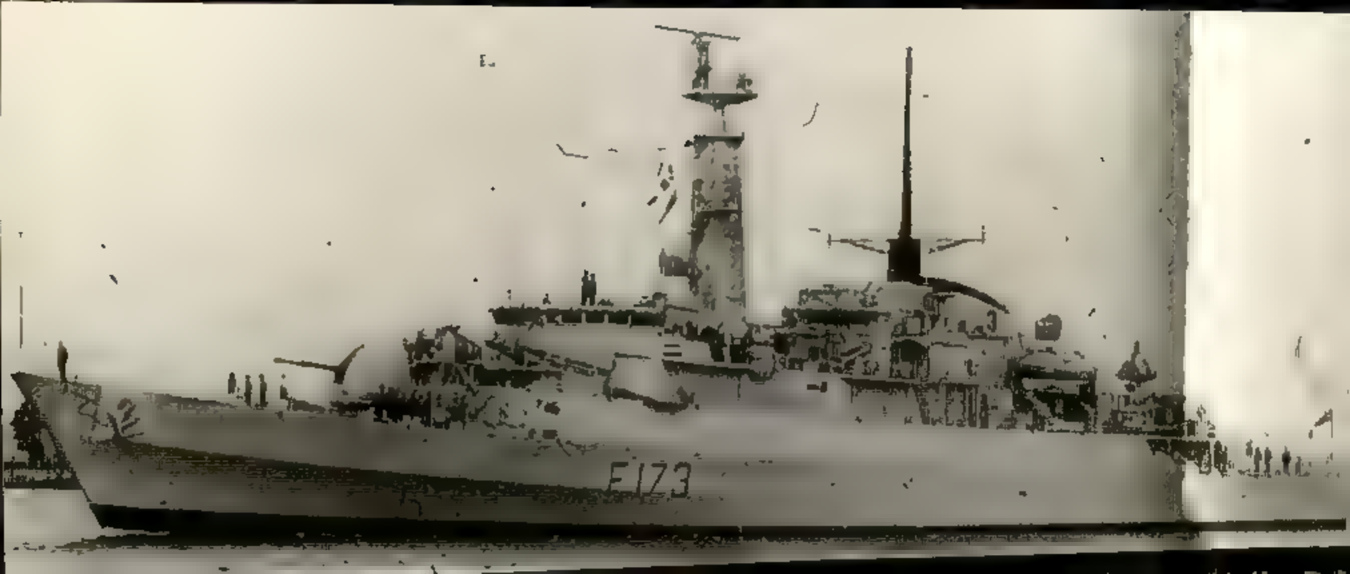

D19

GLAMORGAN


F173

F. 21

ACTIVE


D86

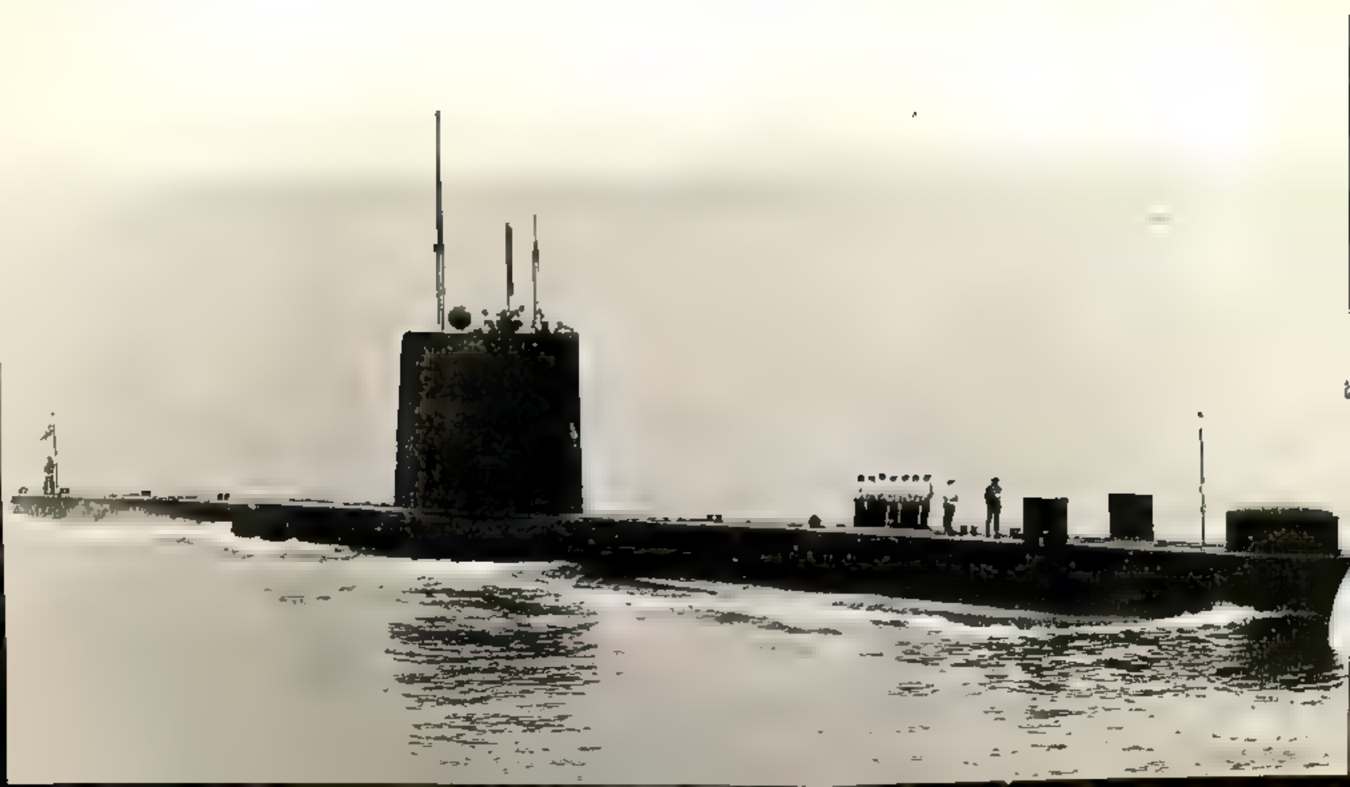
BIRMINGHAN


F129

RHYL


A78

PLUMLEAF



ORACLE

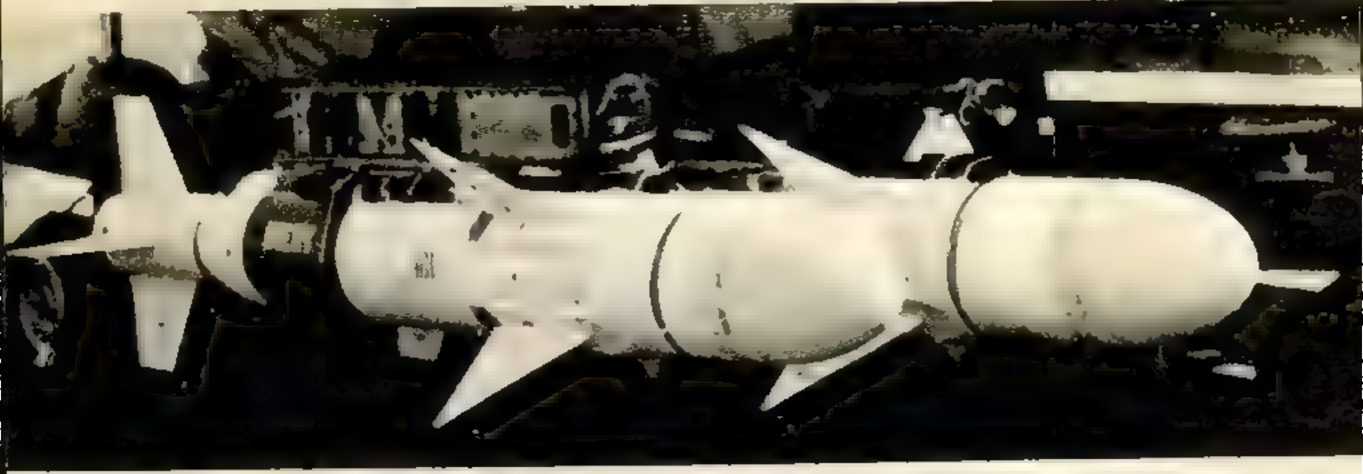

D18

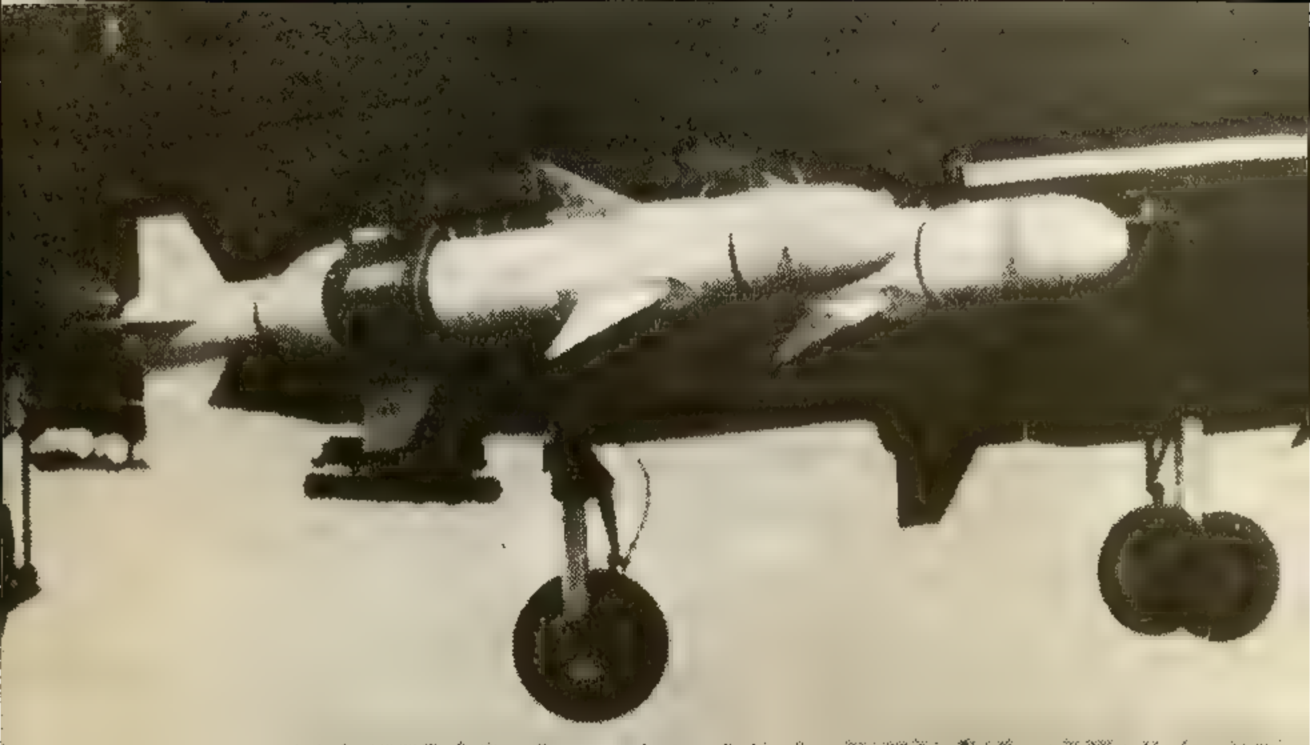
ANTRIM

INTREPID

1

MISIL A/S "SEA SKUA"

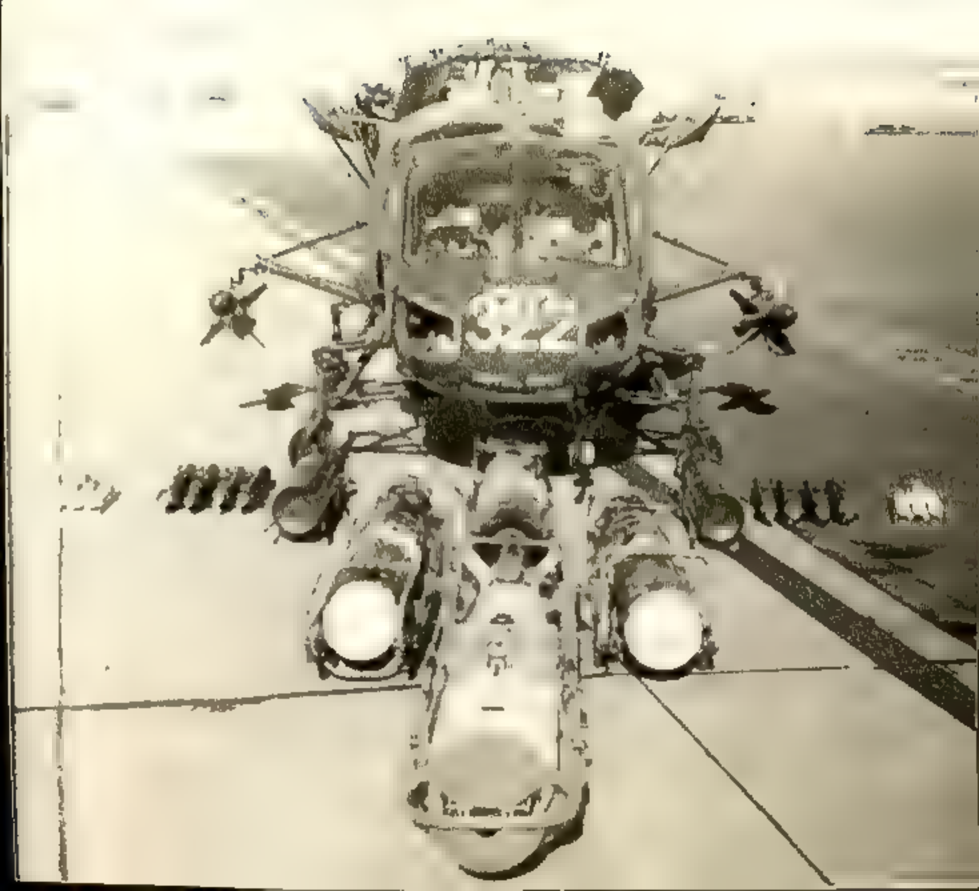




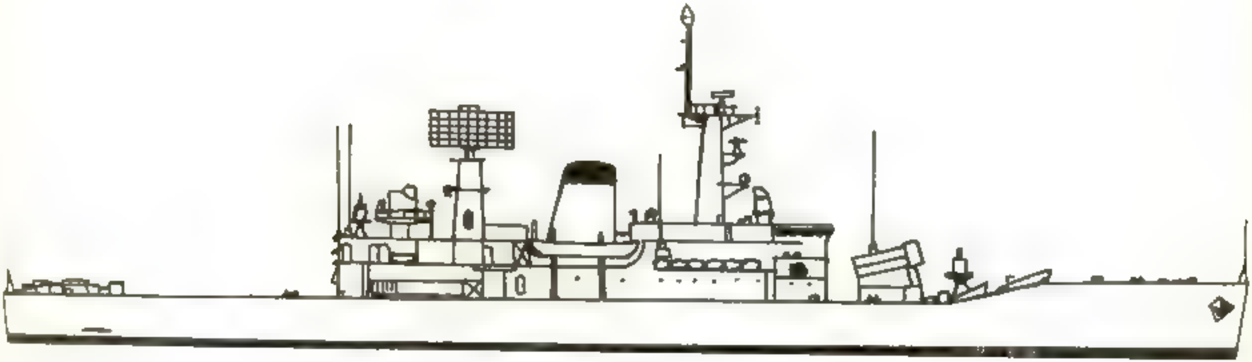
SEA KING A/S (HK?)   2


ROYAL NAVY
056

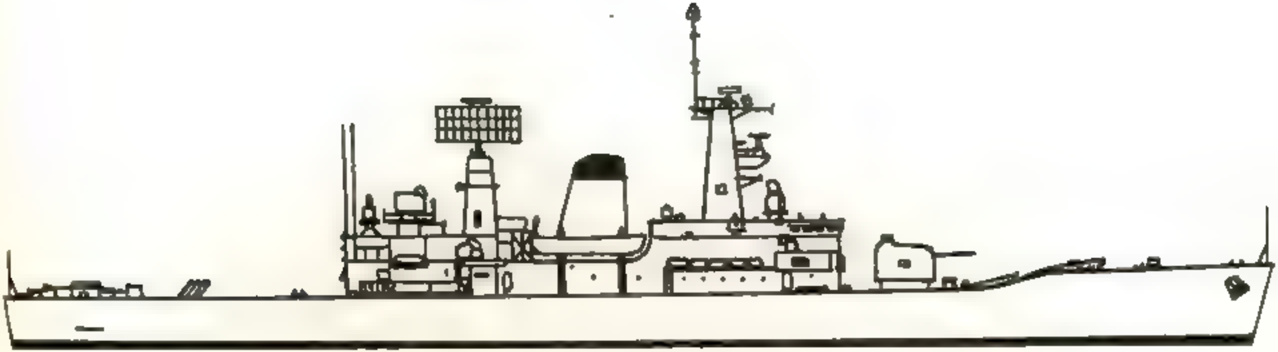
SEA LYNX HAS MK2



Sinfonie



"LEANDER" Class (Exocet)



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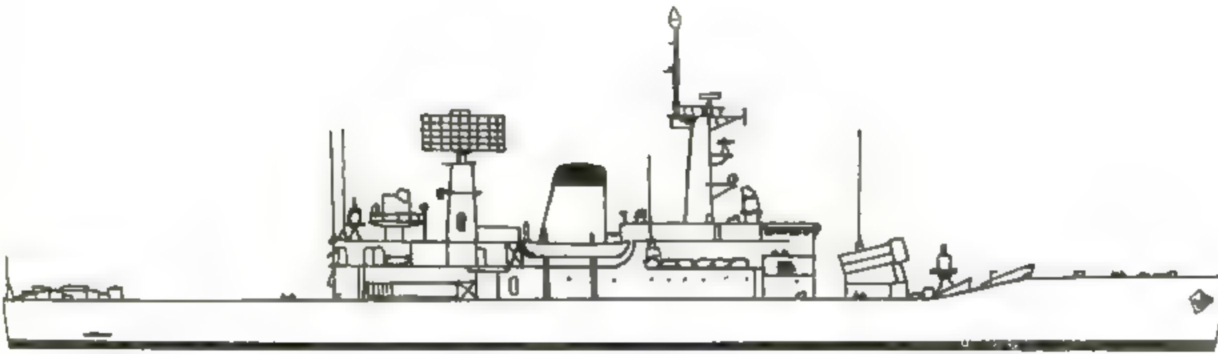

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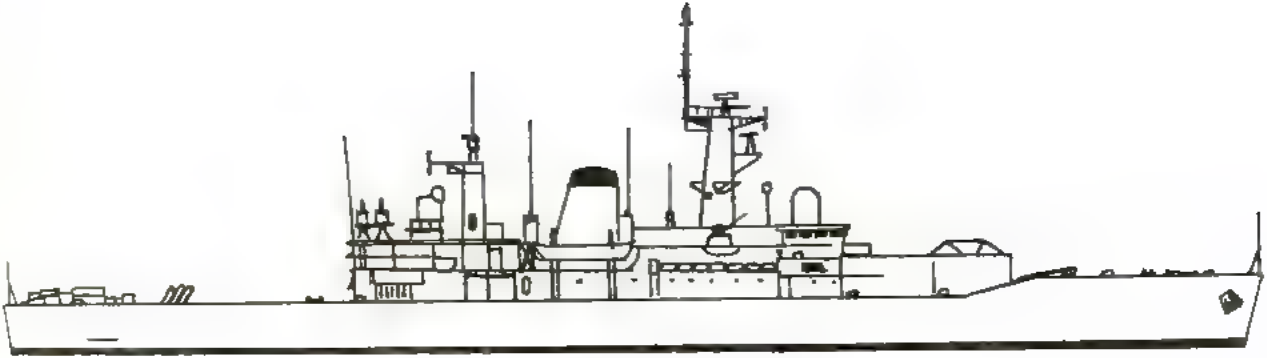
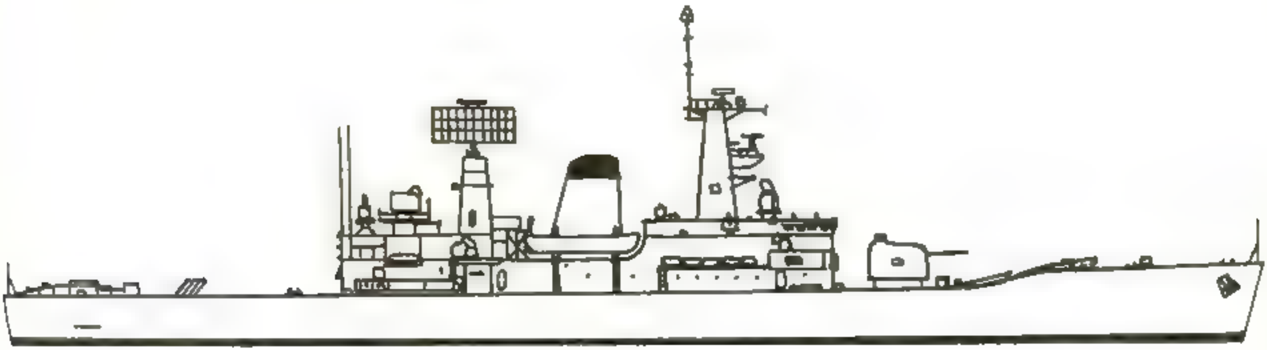
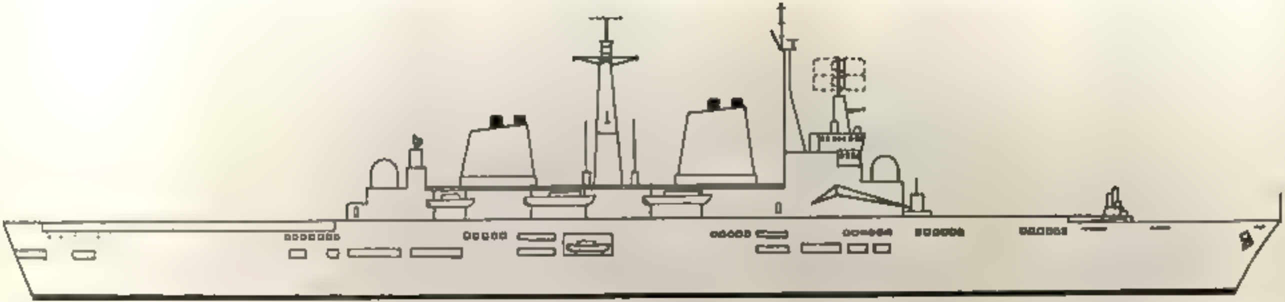


"LEANDER" Class (Ikara)

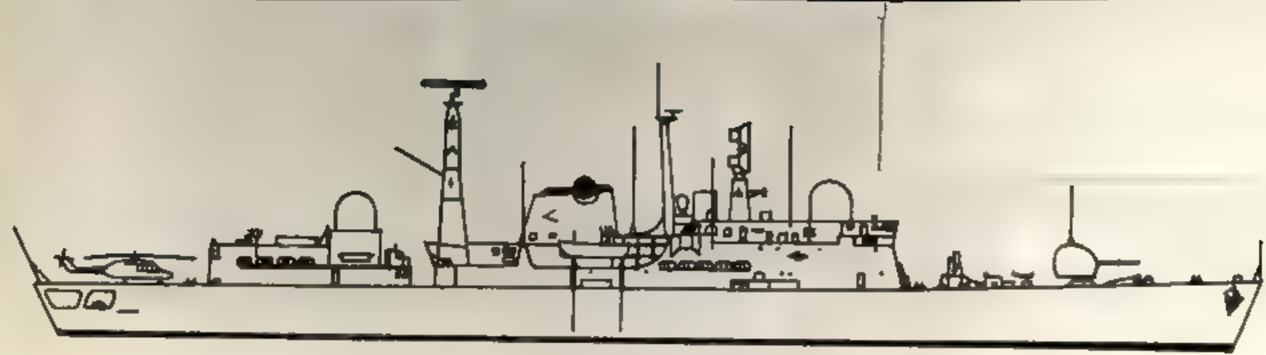


"LEANDER" Class (4-5")

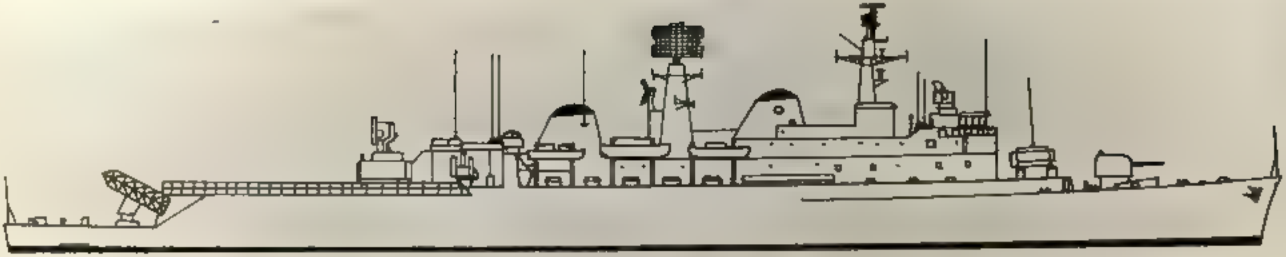
"ROTHESAY" Class



INVINCIBLE



SHEFFIELD



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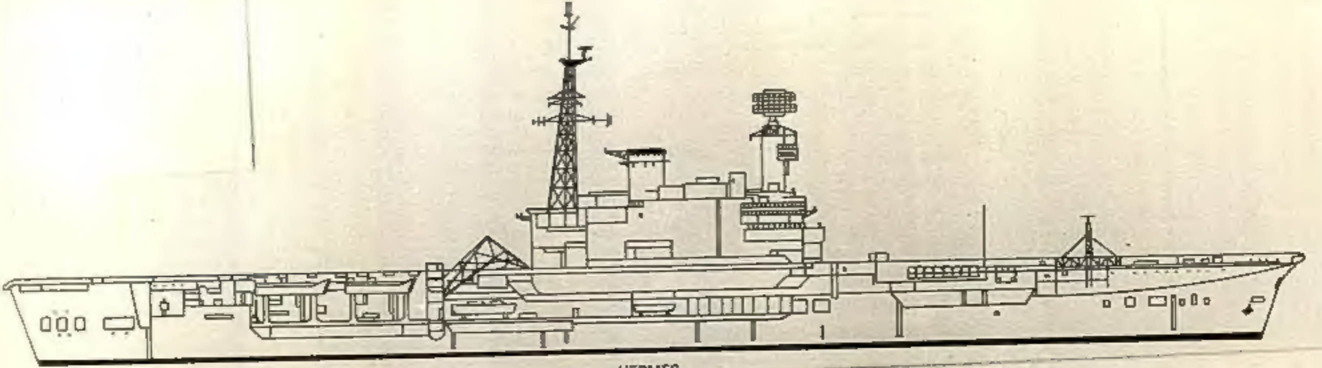

HERMES